

DOCUMENT RESUME

ED 064 214

SO 003 173

AUTHOR Johnson, Ellen K.
 TITLE Cultural Development. Social Studies: Course II-Unit II. Teacher's Manual.
 INSTITUTION Illinois Univ., Urbana. Social Science Curriculum Study Center.
 BUREAU NO BR-5-0383
 PUB DATE 68
 CONTRACT OEC-4-10-058
 NOTE 290p.
 EDRS PRICE MF-\$0.65 HC-\$9.87
 DESCRIPTORS Ancient History; *Anthropology; Area Studies; Concept Teaching; *Cross Cultural Studies; *Cultural Awareness; Cultural Factors; *Human Geography; Instructional Materials; Physical Geography; Resource Materials; Secondary Grades; Sequential Programs; *Social Studies Units; Teaching Guides; Western Civilization; World History

ABSTRACT

This teachers guide for a secondary course on cultural development builds upon earlier sequential learning courses and deals with concepts and generalizations drawn from the field of anthropology. Primary objectives are to develop students' understanding and awareness of culture. Five sections comprise this 10-week course. The nature of culture is presented in the first section. Section two focuses upon early man and how physical environment influenced his culture. The third section, dealing with archaeological methodology, is organized around the question: "How do we find about cultures of the past?" The food producing revolution is studied in the fourth section. Approximately half the manual is devoted to case studies of the two civilizations of Mesopotamia and Peru in section five. Instructional materials suggested include book, slide, and film bibliographies; student readings; and lists of recommended classroom activities. A student manual is incorporated into each section of the guide. Related documents are: ED 048 162, SO 003 169 through SO 003 175. (Author/SJM)

OE-NCEA
BR5-0383



SO

CULTURAL DEVELOPMENT

Social Studies II - Unit II
Teacher's Manual

1967

Prepared by the Social Science Curriculum Study Center, University of Illinois Curriculum Laboratory, 1212 West Springfield Avenue, Urbana, Illinois, for use in University High School and Selected Public Schools Cooperating in Field Testing the Materials.

ED 064214

5003173

FILMED FROM BEST AVAILABLE COPY

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
OFFICE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRO-
DUCED EXACTLY AS RECEIVED FROM
THE PERSON OR ORGANIZATION ORIG-
INATING IT. POINTS OF VIEW OR OPIN-
IONS STATED DO NOT NECESSARILY
REPRESENT OFFICIAL OFFICE OF EDU-
CATION POSITION OR POLICY

CULTURAL DEVELOPMENT

Social Studies: Course II - Unit II

Teacher's Manual

Ellen K. Johnson

Prepared by the Social Science Curriculum Study Center,
University of Illinois Curriculum Laboratory,
1212 West Springfield Avenue,
Urbana, Illinois

1968



PREFACE

The Social Science Curriculum Study Center at University High School, University of Illinois Curriculum Laboratory, Urbana, has as its objective the development of the first three courses in a sequential junior-senior high school social studies program. These three basic courses for the secondary school social studies are a part of a five year sequence designed to contribute to a program of study that introduces students to: (1) the structure of man's social order and how individuals in our own and in other cultures interact with the social order, indeed, both shape and respond to it; (2) the dynamic nature of cultures; and (3) the diversity of cultures.

The development of the three sequential social studies courses begins, first, with the identification and selection of concepts and generalizations essential to understanding man's relationships with his social, economic, and political institutions at different periods in time in our own culture and in other selected western and non-western cultures. In developing the new course materials, priority is given to achieving maximum involvement in inquiring, hypothesizing, testing, interpreting, and ultimately in valuing social data to the end that students arrive inductively at the concepts and generalizations and develop skill in social analysis.

Instructional materials appropriate to teaching the concepts, generalizations, and skills in social analysis are selected using the best of existing materials and developing new materials to achieve the objectives of the new social studies program. Evaluation materials are developed concurrently with the new instructional materials to measure the degree to which the instructional materials and procedures achieve the predetermined objectives.

The procedure followed in the development of each of the three courses involves these five stages:

1. Identification of concepts, generalizations, and skills of social analysis by the project staff in cooperation with academic specialists in art, cultural anthropology, economics, geography, history, political science, regional area studies, sociology, psychology, and teacher education.
2. Preparation of the new course materials and evaluation materials which are then tried out in the social studies classes at the University of Illinois High School.
3. Revision of the new courses and evaluation materials and preparation of a Teacher's Manual with tryout in a small number of selected pilot schools whose teachers have benefit of consultant help by the project staff including orientation to the new materials in summer institutes and conferences during the school year.
4. Second revision of the new materials and tryout in a larger number of cooperating public schools with continued teaching and revision at the University of Illinois High School.

PREFACE

5. Further analysis of selected data from trial in the University of Illinois High School, and in cooperating public schools field testing the materials, and publication of the new course materials.

Building on the concepts and generalizations introduced in the units of Course I including: The Family in Society, Unit I; Man's Economic Institutions, Unit II; and Man's Political Institutions, Unit III, the emphasis in Course II is on those historical developments that affected all mankind. Selected simple cultures as well as advanced regional cultures in Eurasia and the New World are studied. In all instances the emphasis is on the PROCESS OF DEVELOPMENT whereby man, coping with given conditions in his physical environment resolves the persistent problems of transmitting the cultural heritage, allocating political power, and devising ways of provisioning the members of the society.

The first unit of Course II deals with Man and His Physical Environment. Concepts and generalizations drawn from geography, in the main, are introduced and developed with landforms, climate, vegetation, soils, minerals, and location studied globally in relation to the distribution of man. A series of transparent overlays has been developed along with other visual aids including slides, maps, and selected films to facilitate the teaching of basic geographic concepts and generalizations inductively when appropriate.

The second unit of Course II, Cultural Development, a 10 week unit, deals with concepts and generalizations drawn primarily from the field of anthropology. In the first section of this unit is presented the nature of culture, the characteristic way in which man lives. The unit is designed to develop students' understanding of "culture" and to sharpen their awareness of and perceptions about "cultures."

The development of culture and of man's physical being and relationships between these two are considered in the second section of the unit. The importance and nature of natural selection are dealt with.

The third section of the unit deals with archaeological methodology. How does the archaeologist get his information and on what kinds of data does he base his inferences about cultures? Archaeology is seen as giving us information on man's evolution and on man's cultures through the ages.

The food producing revolution is dealt with in the fourth section of this unit. The domestication of plants and animals was probably the greatest invention of man.

In the fifth section of the unit, two emerging civilizations in Mesopotamia and Peru are studied and compared so students can more clearly perceive the process of development, the characteristics of the cultures at various stages of development, and the nature of "civilization".

The materials for Unit II, Course II on Cultural Development include: (1) annotated bibliographies of books for teacher and/or student reference; (2) slides with legends and guidelines; (3) annotated films for student viewing; (4) recommended classroom activities; (5) selected readings and teaching guides for teachers; (6) readings for students; (7) transparencies and illustrations; (8) a unit test.

PREFACE

The materials in this Teacher's Manual, CULTURAL DEVELOPMENT, and in the Student's Manual, have been developed by the staff at the Social Science Curriculum Study Center, University High School, University of Illinois, Urbana, in cooperation with Project Social Studies, U. S. Office of Education, Department of Health, Education and Welfare.

These materials are being taught for the third time in University High School and in a small number of public schools in Illinois cooperating with the Social Science Curriculum Study Center in field testing the new instructional materials.

All copyrighted materials are used with permission of the publishers and/or authors for this version and may not be reproduced. All other materials have been developed by the staff at the Social Science Curriculum Study Center and may not be reprinted or reproduced in any form without their permission.

August 1967

Ella C. Leppert, Director
Social Science Curriculum Study Center
University High School
University of Illinois
Urbana, Illinois

LISTING OF COPYRIGHTED MATERIALS USED
IN THE TEACHING OF THIS TEXT

Appearing below and on the following pages is a listing of all materials used in this text which have been borrowed from other sources, and which have been omitted from this version of CULTURAL DEVELOPMENT in compliance with copyright law.

INTRODUCTION and THE NATURE OF CULTURE

T-7 [Basic Needs/Cultural Responses (a listing)]

Malinowski, Bronislaw. A Scientific Theory of Culture (New York: Oxford University Press, 1960), p. 91.

T-22 [Solid American Citizen]

Linton, Ralph. The Study of Man. Copyright, 1936, by D. Appleton-Century Company, Inc.

SM [on page with illustration of hand holding torch--a short quote from, . . .]

Dubos, Rene. The Torch of Life. Copyright, 1962 by Pocket Books, Inc.

20-22 [Culture and Society]

Brown, Ina Corinne. Understanding Other Cultures (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1963).

EARLY MAN

32 [World Map]

Rand McNally Company.

ARCHAEOLOGY

T-16 [short quote]

Berton, Pierre. My War With the 20th Century (Doubleday and Company, Inc., 1965).

39-40 [The Archaeological Survey of Missouri]

Chapman, Carl H., and Eleanor F. Chapman. Indians and Archaeology of Missouri (Columbia: University of Missouri Press, 1964), pp. 121-133, abridged.

Listing of Copyrighted Materials Used
in the Teaching of this Text

2

44-48 [The Archaeologist at Work]

Chapman, Ibid., pp. 135-145.

49 [diagram of the Gamble site in Lawrence County near Lawrenceville, Illinois]

Illinois Archaeological Survey, Bulletin No. 2. Indian Mounds and Villages in Illinois (Urbana, Illinois: Illinois Archaeological Survey, Inc., 1960), p. 34.

53 [What is 'the Archaeological Record'?]

Childe, V. Gordon. Piecing Together the Past (London: Routledge and Kegan Paul, 1956), pp. 16, 30-33, abridged.

THE FOOD PRODUCING REVOLUTION

T-3 [short quote]

Reed, Charles A. "Animal Domestication in the Prehistoric Near East," Science, Vol. 130 (Dec. 1959), p. 1629.

T-4 [short quote]

Braidwood, R. J. Prehistoric Men (Chicago: Field Museum of Natural History, 1959), p. 146.

T-7 [short quote]

Montagu, Ashley. Man: His First Million Years (Cleveland, Ohio: The World Publishing Company, 1957), p. 125.

63 [short quote]

Reed, Charles A. "Animal Domestication in the Prehistoric Near East," Science, Vol. 130 (Dec. 1959), p. 1629.

64 [The First Domestication]

Carrington, Richard. A Million Years of Man (Cleveland, Ohio: The World Publishing Company, 1963), pp. 166-167.

66 [short quote]

Hawkes, Jacquetta. Prehistory (Harper and Row, 1963), pp. 219, 220.

67 [short quote]

Sauer, Carl O. Agricultural Origins and Dispersals (New York: The American Geographical Society, 1952).

Listing of Copyrighted Materials Used
in the Teaching of this Text

3

68 [short quote]

Sauer, Ibid., pp. 24-25.

70 [short quote]

Sauer, Ibid., pp. 23-24.

74 [illustration "Fourteen Species of Wheat"]

Mangelsdorf, Paul C. "Wheat," Scientific American, Vol. 189 (July 1953), pp. 52-53.

80 [illustration "Three New World Grasses"]

MacNeish, Richard S. "The Origins of New World Civilization," Scientific American, Vol. 211 (Nov. 1964), p. 35.

84 [illustrations/maps]

Scott, John Paul and John L. Fuller. Genetics and the Social Behavior of the Dog (Chicago: University of Chicago Press, 1965).

MESOPOTAMIA

T-13 [Mesopotamia: Encapsulated History]

Cohn-Haft, Louis. Source Readings in Ancient History (New York: Thomas Y. Crowell Company, 1965), pp. 11-12.

T-19-20 [Regime of the Tigris and Euphrates]

Fisher, W. B. The Middle East (E. P. Dutton and Company, Inc.), pp. 358-363, abridged.

T-21 [Theories of Origin of the Lower Mesopotamian Valley]

Fisher, Ibid.

T-28 [short quote]

Adams, Robert McC. The Evolution of Urban Society (Chicago: Aldine Publishing Company, 1966), p. 16.

Listing of Copyrighted Materials Used
in the Teaching of this Text

4

92 [short quotes]

Cottrell, Leonard. Land of the Two Rivers (Cleveland: The World Publishing Company, 1962), p. 10.

Frankfort, H., et al. Before Philosophy (Baltimore: Penguin Books, 1959), pp. 138-39.

93 [short quote]

Mellaart, James. Earliest Civilization of the Near East. Copyright 1965 by Thames & Hudson Limited.

95 [Climate]

Fisher, W. B. The Middle East (New York: E. P. Dutton and Company, 1961), pp. 368-71, abridged.

99 [short quote]

Braidwood, Robert J. "The Agricultural Revolution," Scientific American, Vol. 203 (September 1960), p. 148.

105 [short quote]

Childe, Gordon. What Happened in History (Harmondsworth, England: Penguin Books, Ltd., 1954), pp. 89-90.

107 [short quote]

Braidwood, Robert J. The Near East and the Foundations for Civilization (Eugene, Oregon: Condon Lecture Publications, Oregon State System of Higher Education, 1952), p. 6.

114-115 [excerpts--Ur-Nammu's law code]

Goetze, Albrecht. "The Laws of Eshunna--Discovered at Tell Harmal," Sumer, IV: 2 (Sept. 1948), pp. 69-91. Reprinted in Cohn-Haft, Louis, Source Readings in Ancient History (New York: Thomas Y. Crowell Company, 1965).

116-117 [excerpt from. . .]

Kramer, Samuel Noah. History Begins at Sumer (Garden City, New York: Doubleday Anchor Books, 1959), pp. 137-138.

Listing of Copyrighted Materials Used
in the Teaching of this Text

5

117 [short excerpt from. . .]

Cottrell, Leonard. Land of the Two Rivers (Cleveland: The World Publishing Company, 1962), pp. 71-72.

118-119 [description of excavations of the Ziggurat of Ur]

Woolley, C. Leonard. Ur of the Chaldees (New York: W. W. Norton and Company, Inc., 1965), pp. 129-131.

120-122 [short quotes from the following sources]

Woolley, C. Leonard, Ibid., p. 145.

Kramer, Samuel Noah. History Begins at Sumer (Garden City, New York: Doubleday Anchor Books, 1959), p. 134.

Ibid., pp. 122-124 abridged.

Ibid., pp. 122-124.

Cottrell, Leonard. Land of the Two Rivers (Cleveland: The World Publishing Company, 1962), p. 55.

Kramer, Samuel Noah. History Begins at Sumer (Garden City, New York: Doubleday Anchor Books, 1959), pp. 122-124.

PERU

T-12-21 [The Central Andes]

Collier, Donald. "The Central Andes," in Braidwood, Robert J. and Gordon R. Willey, Eds. Courses Toward Urban Life (Chicago: Aldine Press, 1962).

T-37-42 [The Quipu]

Baudin, Louis. Daily Life in Peru "The Knotted Strings and the Method of Numbering" and "Administrative Officers and the Triumph of Arithmetic" pp. 100-102. Copyright 1962 George Allen and Unwin, Ltd.

T-44-45 [short quote]

Bushnell, G. H. S. Peru (New York: Frederick A. Praeger, Inc., Publishers, 1963), p. 30.

Not
taken
out

Listing of Copyrighted Materials Used
in the Teaching of this Text

6

131 [short quote]

Collier, Donald. "The Central Andes" in Braidwood, Robert J. and Gordon R. Willey, Eds., Courses Toward Urban Life (Chicago: Aldine Press, 1962).

137 [map of the temple construction of Chavin]

Rowe, John H. Chavin Art: An Inquiry into its Form and Meaning (New York: The Museum of Primitive Art, 1962), p. 9.

147 [feather textile designs]

O'Neale, Lila M. Textile Periods in Ancient Peru: II Paracas Caverns and the Grand Necropolis. Publications in American Archaeology and Ethnology, Vol. 39, No. 2 (1942), plate 2, p. 195.

155-159 [A Story of a Visit to the Last Inca, Titu Cusi]

Bingham, Hiram. Lost City of the Incas (New York: Atheneum, 1963), pp. 55-61, abridged.

162-163 [The Inca Agricultural Calendar]

Baudin, Louis. Daily Life in Peru "Economic Life, Agriculture and Fishing," Chapter 13, pp. 218-220. Copyright 1962 by George Allen and Unwin, Ltd.

UNIT II - CULTURAL DEVELOPMENT

TABLE OF CONTENTS

	Pages
Section 1: The Nature of Culture	1-22
Section 2: Early Man	23-33
Section 3: Archaeology	35-59
Section 4: The Food Producing Revolution	61-86
Section 5: The Emergence of Civilization	
Part 1: Introduction and Mesopotamia	82-125
Part 2: Peru and Conclusions	127-175
Part 3: Theories about the Emergence of Civilization	177-181

THE NATURE OF CULTURE
Introduction and Teacher Background

UNIT II - CULTURAL DEVELOPMENT
Section I - The Nature of Culture
SELECTED BIBLIOGRAPHY FOR TEACHERS*

Berreman, Gerald. Behind Many Masks, Monograph of the Society for Applied Anthropology, No. 4. (Lexington, Kentucky: Lafferty Hall, University of Kentucky).

In this monograph is presented an interesting comparison of the position of an anthropologist trying to study a culture with someone in a theater audience. This person sees actors on the stage playing to the audience. The real action is backstage, though, and he can't get back there to see it because he's not a member of the cast (which is made up of members of the culture he is studying).

Birket-Smith, Kaj. The Eskimos (London, England: 36 Essex Street W.C.2, 1959. Methuen and Company, Ltd.).

This book appears to be the most complete and accurate book on Eskimo culture. It would be a good source of additional data.

Brown, Ina Corinne. Understanding Other Cultures (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1963).

This book, written for the general reader, provides an excellent introduction to basic anthropological theory. The entire book can be considered a description of what culture is.

Goldschmidt, Walter, Ed. Exploring the Ways of Mankind (New York: Holt, Rinehart, and Winston, 1960).

In this book both pages 2-10 and an article by George Peter Murdock entitled "Universal Aspects of Culture" (pages 653-662) would be helpful in understanding what culture is. The book consists of a collection of articles about societies which fit in different categories of particular cultural behavior.

Kroeber, A. L. and Clyde Kluckhohn. Culture: A Critical Review of Concepts and Definitions (New York: Vintage Books, 1963).

In this book numerous definitions of culture are categorized and explained. Culture would be a good reference book and could be used, also, as a source for generalizations about culture.

*All of the following books except Four Ways of Being Human and The Eskimos are available in paperback editions.

THE NATURE OF CULTURE
Introduction and Teacher Background

Lisitzky, Gene. Four Ways of Being Human (New York: The Viking Press, 1961).

The "Introduction" to this book is a good general statement of what culture is. The four case studies of cultures in the book (the Maori, the Eskimo, the Semang, and the Hope) are well-written. Students as well as teachers would enjoy this book.

Montagu, Ashley. Man: His First Million Years (Cleveland: The World Publishing Company, 1957).

Chapter 8, "Needs and Culture," would give you a good introduction to the concept of culture. Some of your students might want to read this, also.

Oliver, Douglas L. Invitation to Anthropology (Garden City, New York: The Natural History Press, 1964).

This small book provides a brief summary of the concerns of the field of anthropology and explanations of some of its concepts. It is lacking in examples illustrating the terms explained, so really it should be read in conjunction with other books on anthropology.

THE NATURE OF CULTURE

Introduction and Teacher Background

ADDITIONAL ACTIVITIES

You might want to invite your class or go to visit people who live according to a culture or subculture different from the one of most of the members of your class.

Perhaps there is someone in your community who has travelled to other countries (or has had experience in other cultures) who could speak to your class and/or show pictures or slides.

FILMS

Show at least one film and preferably two. There are some suggestions in the manual at appropriate points regarding use of films. Actually, in this section films can be profitably "worked in" at almost any point. Also, data from one film may be used several times in different contexts.

The following is a list of suggested films. If you find others, please make note of this.

Eskimo Family. University of Illinois. (eb), general, 17 min., 50891, color: \$5.65. University of Indiana. 17 min., sd, color, GSC-790: \$6.40. Pictures an Eskimo family going to a spring camp site and a trading post. Describes how Eskimos have had contact with modern technology and have become somewhat acculturated. Use especially for culture change and for data on Eskimos in the modern world.

Eskimo Sea Hunters (Northwestern Alaska). University of Illinois (ldr; uw), i-j, 19 min., 51382, bw: \$4.35. University of Indiana [titled Eskimo Hunters], 21 min., sd, b&w, GS-416: \$4.15. Pictures the way of life of Eskimos at Point Hope, an Alaskan seashore village. Shows a lot of activities but is narrated by a boy and is sometimes difficult to understand.

Eskimo Summer. University of Illinois (nfbc), general, 16 min., 51383, color: \$5.05. Pictures the search for food and other activities of Canadian Eskimos during the short summer.

Family of Ghana. University of Indiana, 30 min., sd, b&w, GS-941: \$5.40. Illustrates the way of life of a family living on the coast of Ghana and dramatizes the contrast between old and new ways; would be a useful film for illustrating culture change.

How a Fishing People Live. University of Illinois, (kb), i-j-h, 9 min., 44600, b&w: \$2.15. Tells about a North Pacific fishing people and how their lives depend upon their fish. Shows the tragedy which occurs when the rains come and their catch is lost.

THE NATURE OF CULTURE

Introduction and Teacher Background

How a Hunting People Live. University of Illinois, (kb), i-j-h, 10 min., 00550, b&w: \$2.15.

Deals with the way of life of the Mongol people of Siberia, a people who depend on forest animals for their livelihood. Shows marriage practices and division of labor especially well.

How the Desert People Live. University of Illinois. (kb), i-j-h, 11 min., 44800, b&w: \$2.15.

Deals with the way of life of wandering tribes in the Sahara Desert of North Africa and the deserts of Gobi and Turkestan. Shows people tilling a tiny patch of fertile land using rudimentary irrigation methods.

The Hunters. University of Illinois, (hupm), h-c-a, 73 min., 2 reels, 98300, color: \$17.70. University of Indiana. 76 min., 2 reels, sd., color GSC-1010: \$25.15.

Pictures and describes the Bushmen of Southwest Africa and the Bechuanaland Protectorate engaged in their unceasing quest for food.

Life in Hot Rain Forests (Amazon Basin). University of Illinois. (c), i-j-h, 13 min., 60034, color \$5.05. University of Indiana. 13 min., sd, color GSC-863: \$2.90.

Shows the way of life of a people living in the Amazon River basin. Illustrates very well the preparation of manioc, one of the important staple foods in the world.

Life in Hot, Wet Lands (The Congo Basin). University of Illinois. (c), i-j-h, 11 min., 02179, b&w: \$2.35. University of Indiana. 1 min., sd, color, GSC-453: \$3.40; b&w GS-453: \$2.15.

Pictures a boy and his family in the Congo region. May be used to show how physical environment affects culture. May seem juvenile to some students but contains a lot of good data. Would be a good film, being fairly short, to use as part of a test, having the students describe and analyze what they have seen of the culture represented.

Man and His Culture. University of Illinois. (eb), h-c-a, 15 min., 51643, \$3.15.

An excellent film. Presents in an entertaining way many of the learnings in this section, such as the fact of cultural diversity, the differences and similarities in how men satisfy their basic needs, and some of the problems faced in all cultures. Culture change and resistance to this change are also dealt with. If the film is selected, you will probably want to view the film twice, once for enjoyment and once for the large quantity of information presented in the film. The film could be used in place of the Museum of Man recording or it would be an especially good finale for the section.

Nanook of the North. University of Illinois. (rof, edited by heeed), j-h-c-a, 52 min., 2 reels, 81245, b&w: \$12.30. University of Indiana. 51 min., 2 reels, sd, b&w, CS-453: \$10.40.

Portrays various activities in the life of an Eskimo hunter and his family in the Hudson Bay region in 1922.

16/17

THE NATURE OF CULTURE

Introduction and Teacher Background

New Lives for Old: A Case History in Anthropology with Dr. Margaret Mead (Horizons of Science Series). University of Illinois. (albu for hosc and ets), j-h-a, 20 min., 51157, color: \$2.15. University of Indiana. 20 min., sd, color, CSC-1157: \$7.15.

Presents evidence of cultural change among the Manus of the Admiralty Islands. Describes some aspects of culture change. Does not show many activities in the life of the Manus, however.

People of the Congo (The Mangbetu). University of Illinois. (eb), i-j-h-c, 10 min., 26700, b&w: \$2.35. University of Indiana. 10 min., sd, b&w, GS-16: \$2.16.

Illustrates many activities in the life of the Mangbetu of the Congo, including the preparation of bitter manioc. Is especially good for showing crafts.

University of Illinois films:

Films may be rented from one to five consecutive weekdays (Monday through Friday) at the basic rental rate listed for each film. To rent films, write to: Visual Aids Service, University of Illinois, Division of University Extension, Champaign, Illinois 61822.

University of Indiana films:

Films may be rented from one to five consecutive days at the basic rental rate. Again the standard booking is for two days. To rent films, write to: Audio-Visual Center, Division of University Extension, Indiana University, Bloomington, Indiana.

17/18

THE NATURE OF CULTURE

Introduction and Teacher Background

BACKGROUND INFORMATION FOR TEACHERS

An understanding of the concept "culture," the basic concept of the field of anthropology, is a prerequisite to further work in this course. Thus the first section of the Cultural Development Unit, (Course II, Unit II), is devoted to a clarification and elaboration of this concept. The section is organized around the question "What is a 'culture'?" As a general orientation to the concept "culture," you should read Understanding Other Cultures by Ina Corrine Brown (Prentice-Hall, Englewood Cliffs, N.J., 1963. paperback) and you may also want to check the many definitions of the term "culture" listed in Culture: a critical review of concepts and definitions by A. L. Kroeber and Clyde Kluckhohn (New York: Random House, 1963. paperback).

The following ideas and generalizations are basic to understanding the culture concept. They are presented here to give you a broader background so that you can help your students to a better understanding of cultures. This is not to say that you should be sure to present all this information or all this terminology to your students. Actually, many of these ideas should be brought out by the students in their own words as they work with and discuss the material in this section. With this additional background information, however, you may be able to enrich classroom discussion on some topics.

1. PEOPLE EVERYWHERE LIVE IN TERMS OF CULTURE, THOUGH THE CULTURES BY WHICH THEY LIVE MAY BE DIVERSE. Every human society has a culture, though several societies may be represented within one culture or several cultures within one society. Analysis of student work and of test responses has indicated that these two terms are frequently confused. The term "society" generally refers to the people and their social structure and organization; whereas, the term "culture" generally refers to the people's patterned ways of behaving. For clarification of this, read Chapter One in Understanding Other Cultures.

The term "subculture" has been used to refer to a smaller cultural grouping within a larger culture. Thus we could speak of the Chinese "subculture" in San Francisco or, according to some authorities, a "youth subculture" within the larger American culture.

There are two schools of thought regarding cultural diversity. One, the historical school, says that differences in cultures are due to differences in their culture histories. Environment merely prohibits or permits, and economy does not necessarily define the pattern of a society. The other, the environmental school, says that environment determines what a culture will be like, that there is a correspondence between the kind of environment and the kind of economy found in that environment. Actually, neither school of thought is totally right or totally wrong. The actual truth lies somewhere between these two points of view. Cultural traditions (derived through time, historical) are important in a people's knowing what they may do with their environment; the environment figures importantly in which cultural traditions can be used. Thus, historicity and environment are both important in explaining cultural diversity.

THE NATURE OF CULTURE

Introduction and Teacher Background

2. ALL CULTURES MUST HAVE CERTAIN SIMILAR GENERAL CATEGORIES OF ACTIVITIES RELATING TO PROVISIONS ALL SOCIETIES MUST MAKE OR BECOME EXTINCT. These categories may be termed "cultural universals." All cultures have them. The provisions made are derived from and directly related to but are not the same as basic human needs. All human beings have the same basic needs but these needs are met differently in different cultures. Thus all people eat but in not all cultures do all people eat walrus meat--or ants--or beef. (There are really few absolute uniformities in culture content unless the content is stated in such general form that a listing of general categories results.)

For more information relating to basic needs, check almost any introductory psychology textbook. One list of such needs and the cultural responses to satisfy them may be found in A Scientific Theory of Culture of Other Essays by Bronislaw Malinowski, (Oxford University Press, New York, 1960, paperback) Chapter 10. This list is reproduced below:

There are numerous different lists of cultural universals in the literature. One such list is presented in the record "The Museum of Man," Ways of Mankind Series, which you may want to play for your students.

One extremely important cultural universal is the value system. Every culture has a value system by which the phenomena encountered by the people of this culture are classified as good and bad, desirable and undesirable, etc. The way people classify things reflects the cultural orientation of the group in which they have been socialized. Thus a cannibal might regard eating human flesh as desirable and good; whereas, we regard it as undesirable and bad. He has his cultural orientation; we have ours.

Every cultural system should be understood in terms of its own value structure rather than in terms of another culture's values. The words "primitive" and "civilized" may be used by your students in describing various cultures. Yet, do these terms not contain implicit value judgments, judging others by our cultural standards? When discussing value systems with your students, you may wish to take a period to explore with them some values which they hold and the consequences, in terms of other aspects of their culture, of holding these values. You might find some helpful suggestions regarding exploring values in Teaching High School Social Studies by Maurice P. Hunt and Lawrence E. Metcalf (New York: Harper and Brothers Publishers, 1955).

THE NATURE OF CULTURE

Introduction and Teacher Background

Your students may want to know some of the ways in which cultures other than our own satisfy basic needs. A good reference book at this point would be Exploring the Ways of Mankind, edited by Walter Goldschmidt (New York: Holt, Rinehart and Winston, 1960, paperback.). The readings in the book are organized by cultural universals. Films would illustrate some of these ways, too.

An interesting approach to the study of culture traits (specific cultural elements) may be found in Marvin Harris' The Nature of Cultural Things (New York: Random House, 1964, paperback). This approach involves breaking down each activity pursued, such as getting dinner, brushing one's teeth, etc., into specific events. Getting dinner would therefore involve opening and closing drawers, lifting and setting down utensils, etc. Thus, perhaps, eventually, with a large accumulation of such data, some "cultural-level" generalizations could be made about, say, the process of getting dinner.

3. MAN DEALS WITH HIS ENVIRONMENT VIA HIS CULTURE, I. E., IT IS BY MEANS OF HIS CULTURE THAT MAN CAN OBTAIN FROM HIS ENVIRONMENT WHAT HE NEEDS IN ORDER TO LIVE. Culture seen in this sense is an adaptive mechanism; it helps man to adjust to his environment. It also defines for him what he will perceive as important in his environment. Thus, people who have different cultures will be likely to bring different understandings to the same environmental situation.

The physical environment affects culture. Culture also affects the physical environment. The environment may limit the culture to some extent, but it does not determine exactly what that culture will be like. It is possible for different cultures to exist in the same environment. The environment is just one determining factor in shaping a way of life. Do not let your students fall into the trap of thinking that the natural physical environment is the factor which determines what cultures will be like.

The term "ecology" is used to refer to the web of interactions among plants and animals with each other and with the physical environment in the unit of territory in which they are located. The term "human ecology," cf. Man in Nature by Marsten Bates (Foundations of Modern Biology Series, Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1961, paperback), refers to man's place in this web of interactions. The term "cultural ecology" has been used, not to define something so broad as a total relationship between culture (in the generic sense) and environment, but to explain particular cultural features and patterns with reference to a particular environment. For more information regarding "cultural ecology" read Theory of Culture Change by Julian Steward, (Univ. of Illinois Press, Urbana, 1963) Chapter 2.

4. A CULTURE IS A LOGICALLY INTEGRATED WHOLE. Each part of a culture is related to all the other parts of that culture, and all the parts of a culture "make sense" to the people living in them. Thus, a change in one part of a culture will affect other parts of a culture "make sense" to the people living in them. Thus, a change in one part of a culture will affect other parts of that culture. This is

THE NATURE OF CULTURE

Introduction and Teacher Background

well illustrated by the article "In the Wake of the Wheel" by Wesley L. Bliss in Human Problems in Technological Change, edited by Edward H. Spicer (Science Editions, New York: John Wiley and Sons, Inc., 1965, paperback).

5. THE INTERACTION AMONG INDIVIDUALS THAT IS NECESSARY FOR SOCIAL LIVING IS PATTERNED AND ORGANIZED BY CULTURE. A culture is a going concern because its members agree (albeit generally unconsciously) on some basic rules for living together. In order for people to communicate and interact, they must share certain understandings, such as understandings about what constitutes ideal behavior. There also must be a certain degree of expectability in their actual behavior--enough expectability that the culture can continue to exist. For instance, when you put out your hand to shake hands with someone and he reaches out his hand, you expect him to shake hands with you, not use judo to throw you to the ground. People who speak the same language must understand the structure of the language and its vocabulary enough to communicate. Also, a lot of communication and interaction among people takes place in ways other than spoken or written language (cf. The Silent Language by Edward T. Hall. (Greenwich, Conn: Fawcett Publications, Inc., 1961, paperback).

Clyde Kluckhohn has compared these common understandings necessary for people to be able to communicate to a map. If a person can read a particular culture's map of conceptions of appropriate role behaviors, then he can get around in the life of the people of that culture and not get "lost." Some persons feel that all people in a particular culture must have the same cultural "map" in their minds (the concept of "replication of uniformity") whereas others feel that people do not have to have the same map to be able to communicate--they just need to be able to read each other's maps (the concept of "organization of diversity"). For further explanation of these concepts, see Culture and Personality by Anthony F. C. Wallace (New York: Random House, 1963, paperback), "Introduction."

6. ALL CULTURES ARE CONSTANTLY CHANGING. Even cultures which seem to us to have remained stable through the centuries have been changing. So-called "primitive" or "simple" cultures have not been static.

Not all aspects of culture change at the same rate, though. Nonmaterial things (ideals, language, religion, morals, etc.) generally change more slowly than material things, though the two types of things are interrelated. (We have ideas, nonmaterial, about material objects.) Also, the rates of change vary among different cultures so that some cultures are changing faster than others.

When two cultures come into contact in some manner, and changes result in either or both of the cultures, acculturation is said to take place. The term "acculturation" seems to offer problems to some students. Acculturation just involves one culture being influenced by another. This should be understandable to students.

Cities are often focal points of cultural change. Rapid change tends to be divisive, resulting in progressive and conservative factions.

THE NATURE OF CULTURE

Introduction and Teacher Background

New items or new knowledge may come into a culture in several ways. This may happen as a result of borrowing. Then it is said that the item or knowledge has diffused from one culture to another. This term "diffusion" is particularly applicable when the borrowing has taken place over space. New items may also come into a culture as a result of independent invention; i. e., the people in the culture create or figure out the new items or knowledge themselves without "help" from outside the culture.

Change may be directed or nondirected. In directed change the people in one culture (the culture being changed) are subject to the rules and sanctions of the other culture as well as those of their own. In non-directed change the innovations from one culture are adopted into another culture in accord with the integrative principles and interests of the "adopting" culture.

Cultural changes may be micro-temporal or macro-temporal. Micro-temporal changes are smaller changes that occur over brief periods of time, such as changes in dress or suit fashions. Macro-temporal changes are larger changes that occur over a long period of time, such as the change from food-gathering to food-producing.

A change in one aspect of culture affects other aspects of the culture. This is due to the complex interrelationships of cultural elements. The article "In the Wake of the Wheel" by Wesley Bliss, found in Human Problems in Technological Change, Ed. by Edward Spicer (Science Editions, New York: John Wiley and Sons, Inc., 1965, paperback, pp. 23-32) demonstrates how one change in a culture leads to others. The world of teen-age fashion aptly demonstrates this, also. Longer hair for boys and shorter skirts for girls leads to new magazine articles, changes in barbering and dressmaking, new school rules, commentary on what modern youth are coming to, etc.

Remember, too, that people and their thoughts and interactions are involved in culture change, not just things. These thoughts and interactions may be thought of as a complex web. A change puts the web a little off balance and it must readjust. This readjustment is culture change.

The following are some books dealing with culture change that you may find helpful:

Spicer, Edward H. Human Problems in Technological Change. (previously mentioned)

Foster, George M. Traditional Cultures: and the Impact of Technological Change (New York: Harper and Row, 1962.)

Goodenough, Ward Hunt. Cooperation in Change (New York: Russell Sage Foundation, 1963.)

THE NATURE OF CULTURE

Introduction and Teacher Background

7. CULTURAL BEHAVIOR IS LEARNED BEHAVIOR RATHER THAN INSTINCTUAL BEHAVIOR. It can thus be said that, "Human social life is culturally, not biologically, determined." (p. 59, Marshall D. Sahlins, "The Origin of Society," in Peter B. Hammond, Ed. Physical Anthropology and Archaeology, Selected Readings. New York: The Macmillan Company, 1964, pp. 59-65, paperback.) Cultural understandings and traditions and, especially, language are passed from one generation to another via socialization (education). Not being genetically transmitted, cultural understandings may be passed on to a wider variety of people over a shorter period of time than genetically-based characteristics. Culture is thus cumulative: traditions can develop and knowledge can accumulate, paving the way for further cultural development.

Man's behavior, being primarily culturally-based, is mostly learned, but the behavior of every other animal is based more on instinct than man's. This instinctual behavior is passed on genetically. Bees may be said to live in societies but they do not possess culture. Their behavior is instinctual; they are born with it. A human being, on the other hand, learns the customs of his society. A Chinese baby raised among Americans would grow up to be American. Animals other than man, and especially primates, do exhibit some learned behavior, and, in some cases, the terms "culture" or "sub-culture" have been used by some to describe this behavior. (See "The Process of Sub-culture Propagation among Japanese Macaques" by Syunzo Kawamuri, in Primate Social Behavior, Charles H. Southwick, Ed. (Princeton: D. Van Nostrand Company, Inc., 1963, pp. 82-90, paperback.) Most anthropologists, however, would reserve the term "culture" for man's way of life.

The question may arise whether or not animals really possess culture, and, if they do, what the difference is between man and other animals. Man teaches his young; so do animals. Man makes tools; so do animals, though only very minimally. Tool-making was long-considered the characteristic distinguishing man from other animals. Recent work of Jane Goodall, however, has shown that chimpanzees make tools. (Jane Goodall, "My Life Among Wild Champanzees," National Geographic, Vol. 124, no. 2, August 1963, pp. 272-308, and Jane Van Lawick-Goodall, "New Discoveries Among Africa's Chimpanzees," National Geographic, Vol. 128, no. 6, December 1963, pp. 802-831. There is also a beautifully illustrated book about her work, My Friends, the Chimps, \$4.25, put out by the National Geographic which you might want to obtain for your school library.)

There is some argument as to whether the difference between men and animals is just quantitative or is also a qualitative difference. Arguing in favor of the latter is the complex configuration of human culture. All its parts are interrelated. Animal "culture," if it can be called this at all, is not as much like this. Most authorities feel that human language, also, is qualitatively different from the sounds animals make as human language possesses grammatical structure. In addition, it seems that only human beings can "pull forth from the memory" large quantities of stored information to use in situations different from the situations in which the information was originally acquired. But, in the final analysis, the question of whether animals may be said to have culture depends on the way in which the term "culture" is defined.

THE NATURE OF CULTURE

Introduction and Teacher Background

8. AS CULTURES DEVELOP THROUGH TIME, THERE ARE SIGNIFICANT PARALLELS IN THE WAYS THEY DEVELOP AND IN WHAT DEVELOPS (AS INSTITUTIONS, MATERIAL THINGS, ETC.). This generalization is the subject of the latter sections of this unit. Suffice it to say here that in the course of cultural development men in different cultures seem to have passed through similar stages or "levels of sociocultural integration" from hunting and gathering to the civilizational level. (See Theory of Culture Change by Julian Steward, previously mentioned.)

Take especial note of the fact that all men have cultures, not just so-called "primitive" men or so-called "more advanced" men. The term culture does not mean the same thing as the term civilization. All men live in cultures, but only cultures which have reached a certain defined level of development may be termed "civilizations."

THE NATURE OF CULTURE

RECOMMENDED TIME TO SPEND ON THIS SECTION: 9-10 school days.

1. Begin by administering the Pre-test. The instructions for giving and scoring the test may be found with the test.

Call the students' attention to this page. Ask them to be thinking about generalizations that can be made about culture as they study it now and during the rest of the semester. They can write their generalizations on page 1 in their manuals.

Whenever class discussion reaches a point of generalization about culture, ask the students to turn to this page, page 1, and formulate their ideas into a statement. Be careful not to call generalizations too soon, however, or the class discussion may turn into a guessing game. Also, let the students put the generalizations in their own words rather than have them guess for your wording. The statements will mean more to them. But do check the wording of the generalizations so the students are saying what they really mean to say.

The following are some of the generalizations which students in past years have written. This is not by any means an exhaustive list.

- "Cultures are always changing."
- "All aspects of culture are interrelated."
- "Some people are more willing to accept change than others."
- " 'Society' refers to the people in a culture while 'culture' is their way of life."
- "A change in one of the elements of culture will affect the other elements."
- "We can introduce a new thing (as a material object) to another culture though this people's concept of the thing may differ from our own concept."
- "Two cultures can possess the same thing but have different concepts of it."
- "To one person, his own culture may seem better than another culture."
- "The categories of cultural universals are the same in all cultures."
- "Every culture has a logic of its own--it all fits together."

2. Begin by showing a film about the way of life of people in a culture unfamiliar to your students. (See the films suggested in the Introduction to this section.) If you are unable to obtain a film, perhaps there would be someone in your community who would be willing to come in and speak about and/or show slides of common activities in another culture. Or, you may make effective use of pictures in the National Geographic or other magazines.

After you have shown the film, ask your students to list what they think are the basic needs of the people they have just "met." Have them compare these needs with their own needs. If their lists of needs are general enough, they should readily see that the basic needs of these people are the same as their own basic needs.

THE NATURE OF CULTURE

Many different people have compiled lists of basic human needs. One of these lists (Malinowski's) is included in your introductory pages to this section. Other lists may be found in almost any general psychology textbook. The following is a two-fold categorization of basic human needs.

Basic individual human needs are based on motives or drives, which are internal conditions which direct men toward certain goals. Some of these drives are biological. They are responses to tissue needs such as needs for water, food, oxygen, sleep, or to avoid pain, too much cold or heat, to relieve sex tensions or to eliminate waste matter.

Satisfying these biological drives serves to maintain the physiological equilibrium of the individual. Other drives are psychological or social. Among these are drives for security, love and esteem, new experience and greater knowledge, approval and prestige, stability of the self-concept. Men seek to maintain a social environment favorable to satisfying their needs.

Why do your students feel that their individual basic needs are similar to the individual basic needs of the people they have just "met"? Do they think that all people have the same basic needs? Why? Some of your students will undoubtedly say that all men are essentially alike. Pin them down on this. How are they alike? Do they look alike? Obviously not. But, also obviously, they do. All men do belong to the same species, Homo sapiens, and they all function pretty similarly physiologically.

Referring again to the film (or slides, or pictures, etc.), ask your students to point out how some of the needs they have listed are satisfied. They may have seen the need for food (the hunger drive) being satisfied by people preparing and eating food or the need for love and esteem being satisfied by family relationships, etc. How are our needs satisfied? Our needs are satisfied (in general terms) in the same ways. In specific terms, however, the needs of different peoples are satisfied in different ways. People in different cultures may eat different foods, wear different clothes, live in different kinds of families, etc.

Heretofore we have been discussing individual basic needs of people. Can your students think of any needs that would be present in a group of people (such as a society) for that group to continue to exist? For one thing, there must be some way to perpetuate group membership. When old members die off, there must be some way to get new members. At schools, new students are admitted. In families, new children are born. These children must be taught ways in which they may satisfy their individual basic needs. Thus they are socialized in the ways of their society (or, if you will, enculturated in the ways of the culture they are born into). In order for the individual basic needs of the members of a society to be satisfied, economic activity must be organized in some manner. Economic scarcity must be coped with. The allocation of political authority must also be dealt with.

THE NATURE OF CULTURE

At this point the class may be ready to formulate one or more generalizations about needs.

3. The students have been watching a culture, in operation. What, now, do they think is meant by the term "culture"?

3

Have them write a well-worded definition of culture in their manuals.

Tape

These definitions can be used as "check points" to see what the students have learned after this section on culture. You may want to record this session on tape.

Some student responses on this question have been:

"A culture is the total knowledge and total production of a people."

"A culture is the way of life of a specific group of people. Some of the elements of culture are beliefs, architecture, morals, methods of agriculture, crafts, products, and religion."

"Culture refers to the literature, art, and music of a people."

"A culture is the way the needs of the people in a society are satisfied."

The term "Culture" as anthropologists use it refers to the total way of life of a people. It is necessary that this way of life provide means by which both the basic needs of individuals and the basic imperatives for the existence of the group or society are effectively satisfied. Other people have used the term "culture" to refer to art, music, literature, but this is not the way we shall use the term here.

Ask several of the students to read their answers aloud. Formulate a tentative definition of culture on the board.

Inquire of your students what they think an anthropologist does. (An anthropologist studies cultures and tries to describe what he has learned about them. See Invitation to Anthropology by Douglas Oliver, American Museum Science Books, The Natural History Press, Garden City, New York, 1964, paperback). Perhaps they will be able to suggest some specific kinds of studies which anthropologists might make.

Ask your students whether any of them have ever known someone in another culture or lived where people were members of another culture. Have them relate their experiences to the class. In discussion, try to help the students to see the logic in some of the customs followed in other cultures. (If there are few students that have had extra-cultural experiences, endeavor to "draw out" the students' experiences relating to other Americans who follow some different customs from the ones their families follow.)

THE NATURE OF CULTURE

From class discussion of the culture concept and extra-cultural and/or extra-subcultural differences, you should have some idea of "where your students stand" with regard to knowledge of other cultures. If you find that your students are definitely lacking in knowledge and understanding of the ways of life of peoples in other cultures, you should show an additional film or assign additional reading. The reading may be in the form of novels or other books about peoples or customs different from ours. Check your school and/or community libraries. You might later want to have the students report on the reading in some manner (individually or in groups) and use the data thereby gained to enrich the entire class's discussion of some topic.

4. Play the recording, "The Museum of Man" (The Ways of Mankind) Series I, put out by the National Association of Educational Broadcasters. The entire Ways of Mankind, Series I, costs twenty-five dollars (\$25.00) but this record may be obtained separately at a cost of four dollars (\$4.00). To purchase this record, call NAEB at 333-0580 or write to them at 119 Gregory Hall, University of Illinois, Urbana, Illinois, 61801. The record "Survival" will also be used as a part of this unit, so you will probably want to purchase the entire series. Other records in the series are particularly good for illustrating different cultural universals. This record will set the stage for a more detailed investigation of the meaning of the term "culture".

Record

(Or, in place of the record, you may show the film Man and His Culture and have students list the universals. Have them note, also, other learnings about the nature of cultures presented in the film.)

On the record, Mr. Goldschmidt describes some of the universals in the life of man. He reminds us that every society must provide for birth, marriage, food, shelter, technology, and death and that every society has communication (language), groups, rules to regulate conduct, authority, status and role, values, arts, religion, and education. (This is just one way to list the cultural universals. There are many ways of listing them. Remember that typologies consist of named categories established by arbitrary criteria.) The students' listening should be directed toward these cultural universals, these general categories of activity which exist in every society and which must be a part of every culture. Space is provided in the manual for them to list these categories.

After the record has been played, discuss the categories with the students and ask them to explain each category, giving examples drawn from our own culture. For example, how does our society provide for obtaining food? What are some groups in our society? What are some things which we value, which we consider important? You may want to use some of the data contributed in (1 or 2) or call on the students to contribute some additional data from other cultures. You may want to contribute some data yourself.

THE NATURE OF CULTURE

This might be a good time to discuss the topic of values. You could start by using the example of long hair for boys or mini-skirts for girls (or other examples specific to your school) and ask the students what would happen if these were worn to school. Do the students and faculty think differently about this? What values are involved here on both sides? Your students may feel that their values and those of the faculty and school administration are quite different. If so, you might want to introduce the term "subculture" and ask whether your students feel that there is something that could be called a "student subculture." Your students might gain a lot by analyzing this "subculture" and how it is different from the larger American culture in certain respects.

Relevant, also, to the topic of values is this quotation from Herodotus:

"If one were to offer men the choice of all the customs in the world, they would examine the whole number and end up by preferring their own."

How do your students feel about this?

In the record it is stated that "Man is one but cultures are many." Write this on the board. Ask the students what they think is meant by "man is one." The responses to look for are those relating to the fact that all men belong to the same species, Homo sapiens, and that all men have the same basic needs. Using the same statement, "man is one but cultures are many," ask your students why they think there are many cultures. They should realize that the cultural universals are satisfied differently in different cultures if the previous lesson "came through."

Why are they satisfied differently? This question would be a good one with which to end a class period. Let the students cogitate on the question and perhaps state some ideas, but don't push them for any answers or tell them they are right or wrong.

Movie
?

As additional activities at this point, you may want to show a film of another culture and have your students write a description of it using these cultural universals as topics or topic headings. Or you may want to ask your students to bring in pictures illustrating different cultural universals. Perhaps their classmates would want to guess what universals are being represented in each picture.

At this point the class may be ready to formulate one or more generalizations about the categories, the "cultural universals."

5. Ask your students what they think it would be like to live in the Arctic. Have them utilize their knowledge from the Geography Unit and their maps to characterize the physical environment of the Arctic.

Have your students read the following two articles about life in the Arctic and answer the questions about the articles. Discuss with them

THE NATURE OF CULTURE



their answers to the questions, making the comparisons between the different ways of doing things of the Eskimos and the men of Camp Century. Use pictures and/or a film to illustrate Eskimo life. Use pictures (and slides, if you have them from last year, numbers 1451, 1452, 1453, 1454, and 1455) to illustrate life at Camp Century. The book City Under the Ice, The Story of Camp Century by Charles M. Daugherty (New York: Macmillan Co., 1963) contains pictures of Camp Century.

Pictures of life in the Arctic in general may be found in these articles:

Dufep, George J. "Nuclear Power for the Polar Regions," National Geographic, Vol. 121, No. 5 (May 1962), pp. 712-730. (Greenland)

LaFay, Howard. "Dew Line," National Geographic, pp. 129-146 (July 1958), Vol. CXIV, No. 1.

Leatherbee, Mary. "Alaska: The Hard Country," Life, Vol. 59, No. 14 (October 1, 1965), pp. 64-89.

"War Watch in the Arctic," Life, Vol. 54 (March 1, 1963), pp. 18-27.

Pictures of Eskimos may be found in the following articles:

Collins, Henry B. "Vanished Mystery Men of Hudson Bay," National Geographic, Vol. CX, No. 5 (November 1956), pp. 669-687.

Douglas, William O. "Banks Island: Eskimo Life in the Polar Sea," National Geographic, Vol. 125, No. 5 (May 1964), pp. 702-735.

Morgan, Audren and Frank Morgan. "Alaska's Russian Frontier: Little Diomedes," National Geographic, (April 1951), pp. 551-562.

From these readings and discussion of them and discussion of question 5, the students should derive some understanding of how people with differing cultures and technologies deal with an environment such as that of the Arctic. They should also begin to perceive some of the complex interrelationships between the culture and the environment. Some of these interrelationships have been stated by students as follows:

"Occupations can be affected by climate, landforms, soil, and vegetation. Different areas might be better for farming or grazing, while others are used for other purposes."

"The ways of living can also be affected by climate. Climatic elements make a difference in the kind of housing that is used. (Eskimos live in stone houses that must be protected against

THE NATURE OF CULTURE

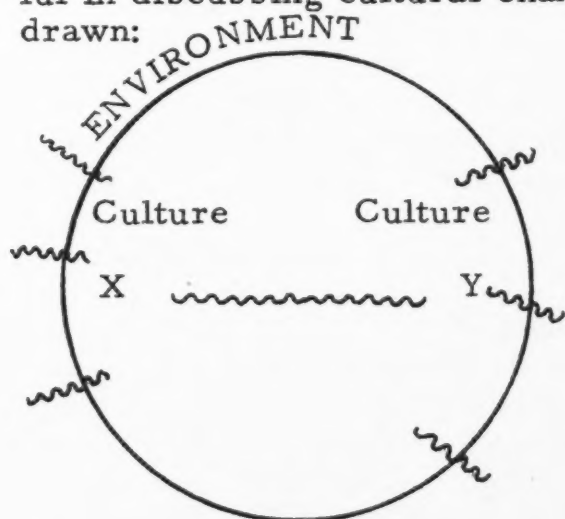
snow and cold weather, while the houses in Caribbean areas must be protected against hurricanes.) The kinds of food that can be grown or hunted vary in different climates. Temperature also makes a difference in the clothing of the people."

"If an Eskimo lived in Miami, Florida, his society and culture would be different. He wouldn't live in a house made of stones and moss and he wouldn't eat seals or polar bears."

Other students were more general:

"The same environment may be developed differently or adapted to in a different manner by one culture as compared to another culture depending on how long the cultures have existed in the environment, the former way of life followed by the cultures, and the amount of communication between the two cultures and with other cultures."

The above statement contains some ideas that would also be very useful in discussing cultural change. The following diagram may be drawn:



X and Y are two cultures which have just entered a certain environmental area. The degree and types of change which would take place in these cultures over time would depend on:

1. the traditions of the cultures when they came into this environment,
2. the environment (Each culture would adapt to its physical environment.),
3. the degree of communication (represented by wavy lines) of the cultures with each other and with other cultures (This would depend on both physical barriers, like wide rivers or mountains, and cultural barriers, like superstitions and conceptions of superiority or inferiority),
4. time.

"Cultures can and do adapt to new environments."

"The physical environments of man affect his way of life (culture) to a great extent because of environmental limitations and restrictions."

"The cultures of different areas can be similar even though the physical environments of these areas may be different." (i. e., American culture within the continental U. S. and at Camp Century).

THE NATURE OF CULTURE

"The way each culture satisfies the cultural universals depends very much on physical environment."

"A culture which changes from one physical environment to another will keep many of its old traditions."

"Culture and environment are profoundly connected. When one changes, aspects of the other changes."

"The environment regulates and controls many things in the culture, such as basic needs and things associated with these needs. But it cannot completely change the religious, moral, educational and traditional aspects of a culture."

Note especially these last statements. Do not let your students fall into the trap of thinking that environment determines cultures or that cultures do all the changing and adapting. Traditions and communication are also important. And through his culture man does change his environment to suit himself--he builds and heats or cools houses, wears clothes, clears forests, plows the ground and plants food.

One student last year in Springfield wrote, "Nowhere does the natural environment completely determine the ways of men but everywhere it limits and influences the human condition."

As an additional activity have your students write 300-word essays exploring some aspect or aspects of the relationships between culture and environment. This has been found to be a profitable experience. Also, it might be wise to have one or more students give reports on some aspects of Eskimo culture that are not economically-based, such as what they do for recreation ("sing-downs," etc.), what some of their social customs are, etc. Then the students will have a better rounded picture of Eskimo life. You might want to show a film picturing and describing the way of life of people in another culture and have your students analyze the relationships of that culture to its environment.

Movie
?

Ask the students to turn to number 5 in their manuals and answer the question. Draw out in discussion their ideas regarding this (Values may come forth in this session, too.) and their reasons for believing as they do.

Play the record entitled "Survival" from the Ways of Mankind Series I. (See page 3 for information regarding obtaining this record.) Listen to the record before class yourself to ascertain that there is nothing objectionable in it. Your students will want to continue their discussion of number 5 after the record has been played. This time they will have more data to go on.

Record

THE NATURE OF CULTURE

6. Ask your students whether there are any cultural differences existing among people in the U.S.. Do all people in the U.S. satisfy their basic needs in the same way? To what extent are there differences? How did these differences come about and why do they exist?

4

Magazine?

There may be students in your class who have travelled to other parts of the country where certain obvious local subcultures exist. Or, there may be recognizable subcultures in your area. Some subcultures you may use as examples are the Chinese (especially in San Francisco), the Spanish-American (especially in the U.S. Southwest), the Amish, etc. Some persons even define a Negro subculture. The National Geographic magazine may contain illustrations of the different specific ways in which the people in certain subcultures in the U.S. satisfy their basic needs. Anyway, your students should readily see that such differences exist, even within the overall grouping which may be loosely termed "American culture." There is diversity within one culture as well as between cultures.

Ask your students why they think these differences exist. Have them list their reasons in their manuals. They will probably readily see that the natural physical environment is a factor here. Adobe houses are practical in the Southwest but they would not be so practical in an area with more rainfall. Another reason for the cultural diversity is the relative isolation of some groups from outside influences. (People in one subcultural group tend to stick with each other spatially and socially, even in cities.) A third reason may be that these groups had differing traditions originally. (The traditional Eskimos and the men of Camp Century lived in virtually the same environment, but they started out there with different traditions.)

Differences may exist among different subcultures, but there are also commonalities. Cultures near each other may adopt things from each other and so become more similar. Cultures change. People see a new thing or way of doing things that they like and, if it fits in with their culture, they may adopt it as their own. This is called "borrowing." Other cultures "borrow" things from us and we "borrow" from them. Ask your students whether they can name any things common in our culture which are borrowed. Have several students read their lists aloud. Then read to them the description of the "solid American citizen" written by Ralph Linton.

THE NATURE OF CULTURE

7. This is an optional reading which you may want to use with your students to make more clear the reasons for cultural diversity. The reading would also answer some of their questions regarding what the life of Eskimos today is like. Do not use this reading if you will be pressed for time on the rest of the unit.

10

Ask the students what they think is the status of the Eskimos today. What is the Eskimo way of life like today? Do Eskimos still follow their traditional way of life? Where do Eskimos live? Draw out responses to these questions and then assign the reading "Eskimos Today."

After the students have read the article and answered the questions, discuss the questions with them. The students should be aware that a lot of material changes have occurred as the Eskimos have adapted more and more to a Temperate Zone way of living (wood houses, etc.). Also, the use of money has changed social patterns since, with money, individuals have more power and are better able to defy authority. The students should be aware of the diversity that exists among various Eskimo cultures. This diversity is the result of some differing traditions originally; the isolation of many small groups; and differing environments, both physical and cultural, (as the administration of Eskimo groups by four different national states). They should also be aware that one change leads to other changes and that material things are adopted more readily and are sometimes less disruptive than changes in social organization and values.

8. Ask your students to read Parts 1, 2, and 3 of "In the Wake of the Wheel" by Wesley Bliss, pp. 23-27 in Edward H. Spicer, Ed. Human Problems in Technological Change. Have them take notes on the readings and discuss their answers to the questions. (Note p. 33 in Human Problems in Technological Change, on which there are some suggestions for discussion about the reading.) Then ask the students to read the rest of the article, Parts 4 and 5, pp. 28-32. Have the students compare their answers to the questions with the outcome of the introduction of the wagon as described in the reading. Were there any changes which they did not anticipate?

17

At this point, perhaps in discussing question c, it would be good to ask the students why people accept new things. Are some people more likely to adopt new ways and new things than others? What would be some ideal circumstances to set up if one were trying to get people to adopt something new? To whom would it be best to appeal? What approaches would probably work best? The "human nature" aspects of culture change are very important. To introduce something successfully, the change agent should know how things are traditionally done and how the ways of doing things in this culture are linked. He must also know how the new trait must affect this linkage.

Perhaps your students would like to try a little "directed change" in their school or community, introducing something new and studying the results.

THE NATURE OF CULTURE

Reading
?

The article "The Wells that Failed" by Allan R. Holmberg, also in Human Problems in Technological Change, would be another good vehicle for helping your students to analyze culture changes. You might have several students read the article, report on the first three parts, and lead the class in discussion to see if their fellow students can analyze the situation, bring out the relevant factors, and guess the outcome.

18

9. Ask your students, as a class, to choose one new thing or way of doing something (a fairly small one, such as shorter skirts for women or longer hair for boys, a new product, etc.) and to explore all the changes in our culture that would result from introducing this thing or way of doing something. For example, suppose Parisian designers decreed that all women's skirts should be two inches above the knee. How would this affect the fashion magazines? Other magazines? The clothing industry (machines, workers)? Morality and religion? School rules? Who would most likely adopt the style first? Who would adopt it last? Would any other clothing be affected (as stockings)? Girls might be more interested in this particular example than boys. Let your students choose an example which interests the majority of the class. One example used successfully last year was the introduction of the electric car.

Have several students read their lists and other students add to these lists. List the changes on the board. When the students seem ready for it, ask them if they can now make any generalizations about culture. (After listing as many changes as they can think of, your students should have some understanding of how all the different parts of culture are interrelated and how a change in one aspect of a culture affects other aspects of that culture.)

19

10. MAKING JUDGEMENTS--CAN WE?

Discuss with the students the question of whether any one culture can be called "better" than any other culture. Ask students to define their criteria for categorizing cultures as better or worse. For example, is our culture better than Eskimo culture or merely different? One set of criteria might be related to degrees of "primitiveness" or "modernity," though, considering the resources and technology at hand in each case, can we really say that the "modern" is better or merely more complex? Is it good to have so much complexity? Is there something to be said for the satisfactions derived from living close to nature? Can we make value judgments about culture at all?

Incidentally, many anthropologists feel that value judgments (good-poor) cannot be made about cultures or aspects of cultures except in that culture's own terms (as a culture would be considered "poor" in one aspect if in this culture peace of mind were valued and yet not present) or in terms of absolute survival (if life is valued, which is culturally based) (as a culture could be considered "poor" or, at least, "ineffective," if its people are starving to death).

THE NATURE OF CULTURE

If all value judgments about a culture must be made in that culture's own terms, then the criteria for making the value judgments are culturally based and are not comparable cross-culturally. Thus we cannot say another culture is better or worse than ours. We can say if we (individually) think one aspect of our culture is better or worse than other aspects (if we define our criteria).

From this lesson, your students should begin to perceive that values are relative. It is "dangerous" to judge others in terms of our values, for such judgment is a basis for prejudice. We should, instead, try to put ourselves "in the place" of others and perceive the world through their eyes to try to understand why they are as they are.

Ask the students whether they can list any more generalizations about culture at this point.

Assign for reading "Culture and Society" by Ina Corinne Brown.

11. After the students have read the article, discuss with them Ina Corinne Brown's ideas and generalizations and any additional statements which the students may have made. You may want to clarify the implications of the words "civilized" and "civilization" at this time.

19

Ask your students whether they see any difference in meaning between the words "civilized" and "civilization." What is the word that means the opposite of "civilized"? "Uncivilized." Can they suggest any synonyms for "uncivilized"? Perhaps they will suggest the word "barbaric." Does the word "barbaric" hold any connotations--i. e., how would you act toward someone you consider barbaric? What impression would you have of him? The students should realize that they would "look down on" such people and probably discriminate against them. They may want to give examples. Might any other peoples think we Americans are barbaric? Why?

Do you now see a difference in meaning between "civilized and "civilization"? What is it? What are you doing when you call a people "civilized" or "uncivilized"? Making value judgments (which are culturally based).

- a. In the past many students have confused the words "civilized" and "civilization" and spoken of the people who live in civilizations as being "civilized." This is not entirely correct. The word "civilized" implies a positive value judgment; whereas, the word "civilization" is a term applied to a certain stage of cultural development and does not imply value judgments. The following procedure may help your students to understand the difference between the two terms.

THE NATURE OF CULTURE

- b. This would be a good time to clear up misconceptions about using the terms "culture" and "civilization," also. Ask your students what they think the difference is between the two terms. How may they be defined and distinguished so they won't be confused? Do all peoples have cultures? (Yes.) Do they all live in civilizations? (No.)

Check your students' definitions of "culture," comparing them to the definitions they wrote on page 1 in their manuals. They should know that a culture is a way of life and all people live by culture. A civilization is a particular kind of way of life. The culture of the people in a civilization has reached a particular level of complexity, of development.

12. Ask each of your students to choose one generalization which has been made about culture and to write a 500-word essay upholding and explaining this generalization using examples, at least some of which must be derived from American culture. (Do not let them duplicate work along these lines that has already been done, such as will be the case if American examples are chosen to support a generalization about cultural universals.)

Send several of the best essays to SSCSC for analysis.

13. Have your students turn back to p. 2. Are there any revisions they would like to make in their definitions of culture?

14. MAKE SURE THAT YOU HAVE FILLED IN ALL THE INFORMATION AND COLLECTED ALL THE DATA (TAPES, etc.) REQUESTED. THEN SEND THE DATA TO SSCSC.

THE NATURE OF CULTURE

_____	_____
_____	_____
_____	_____
_____	_____

b. How do the needs of these people compare with your basic needs?

c. Indicate above how these people satisfy their needs. How do the ways they satisfy their needs compare with the ways we satisfy our needs?

3. Write a well-worded definition of "culture" below. What does the term mean to you?

4. Your teacher will play "The Museum of Man," a record telling about some of man's activities. The museum described in this record is a very unusual kind of museum. Listen carefully to what Mr. Goldschmidt, the narrator, tells you about the categories of things which every society must provide for man and list below the categories he mentions:

<u>Categories</u>	<u>Examples in our Culture</u>
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

THE NATURE OF CULTURE

<u>Categories</u>	<u>Examples in our Culture</u>

In the spaces to the right above write examples from our way of life (our culture) to illustrate each category.

5. Read the two selections about life in the Arctic which you will find on the following pages in your manual. As you read them be thinking about how man's needs are met by both cultures.

Then answer the following questions:

a. How do Eskimos obtain food? _____

b. How do you suppose the men of Camp Century obtain their food?

c. How does an Eskimo provide himself with shelter against the cold?

THE NATURE OF CULTURE

d. How is shelter provided for at Camp Century? _____

e. How is the Eskimo shelter heated? _____

f. How is Camp Century heated? _____

g. Do you think the men at Camp Century could survive if all modern machines, etc., were removed? Why or why not?

6. Why do you think differences exist from culture to culture? List the reasons for these differences below. Can you give examples illustrating your reasons?

Reason

Example

1.

2.

3.

4.

THE NATURE OF CULTURE

THE TRADITIONAL ESKIMO WAY OF LIFE*

The Eskimos, or Inuit ("the people"), as they call themselves, inhabit the Arctic zone of the world. Arctic is where there is a July mean temperature of 50°F or less. It is a region of short, dry summers and long cold winters during which the temperature may fall to seventy degrees below zero. Cold Arctic gales blow the snow there into deep drifts. There are no trees in the Arctic but there is some tundra vegetation. Abundant animal life exists in the Arctic. There are sea mammals - seal, walrus, and whale - polar bears, the Arctic fox, snow hare, caribou, and musk ox. There are fish, too, and in the summer a great many birds come north to these regions to breed.

Physically the Eskimo is not much different from you and me. He cannot swim longer, run faster, or do with less food or sleep than we can. In this inhospitable region the Eskimo has managed to survive by devising his own special equipment to cope with the Arctic. This special equipment, Eskimo material culture, is made from the materials available in the Arctic.

The Eskimos' winter houses, for instance, are made from stones and peat. The stones are laid out in a rough circle about fifteen feet in diameter and piled up and the chinks between them are stuffed with turf. Sometimes there are two layers of stones with turf between. The ceiling consists of large slabs of rock or several layers of skins with moss stuffed inbetween, resting on whalebone rafters, and covered with peat. The whole house is sunk a little below ground level as protection against the storms.

One enters the house by crawling down a long, low tunnel which opens into the house from beneath the floor level. Thus the warm air, always rising, is trapped in the house and cannot escape through the tunnel. Circulation of air is provided by a small hole in the roof which can be opened up to clean out the "stale air" and closed to keep the warm air in. There is one small window made of sealskin in the front of the house and sometimes at the corner of this window is another little air vent. The window lets in light but no one can see through it.

Inside, there is a platform about three feet high across the back of the house. This is the sleeping platform. It is covered with dried grass or peat and furs. Underneath this platform is some storage space. Along the sides of the house are two more, smaller, platforms which provide extra sleeping space or a place on which the blubber lamps are set.

The blubber lamps are hollowed-out pieces of soapstone standing on small stones for legs. For fuel they burn the oil from the blubber of sea mammals. The lamp wicks are made of moss. The lamps burn brightly enough to give the room a soft yellow glow and give off enough heat that the family can get by inside with very few clothes. Tending the lamps is a

*Information for the writing of this article has been drawn primarily from: Freuchen, Dagmar. Peter Freuchen's Book on the Eskimos. (Cleveland and New York: The World Publishing Company, 1961.), and Lisitzky, Gene. Four Ways of Being Human. (New York: The Viking Press, 1961.)

THE NATURE OF CULTURE

The Traditional Eskimo Way of Life

special job of the women. These lamps are the house's only cookstove and water tap, too. The cooking is done in stone pots hung over the lamps. Fresh water is made by placing chunks of snow or ice on a slanted rock over a lamp and catching the dripping water in a sealskin cup.

The familiar igloo of the Eskimo is a temporary shelter, built for the night or for weathering out a storm. It is constructed of blocks of ice in a circular pattern. The man making the igloo stands inside and works in a spiral, piling up the blocks. Women and children caulk the outside with snow. Then the man cuts a low entrance in the wall and steps out. The igloo has an entrance tunnel similar to the entrance tunnel on the stone house. And the interiors of the two houses are furnished similarly. An igloo can be built in about an hour.

The clothing of the Eskimos is made from the skins gotten on the hunt. They wear long, loose sealskin coats and pointed hoods with an edging of fur around the face. The men wear trousers made from white polar bear fur. They also wear shirts of eider down, stockings made of the fur of the Arctic hare, sealskin mittens and knee-high sealskin boots stuffed with dry moss for warmth and protection from dampness. The women wear trousers of fox skin and their boots reach to their hips. All of these clothes are made by the women with needles made of bone or walrus ivory and thread made of caribou sinews. It is important that these clothes be well-made. The Eskimos' very life depends on them. Damp, torn, or poorly made clothes can mean death in the Arctic.

The food the Eskimos eat consists mainly of the meat obtained by the men in the hunt. The primary weapon used in the hunt is the harpoon. This complex weapon is made from driftwood, bone, and thongs. When hunting a seal, one of the primary sources of food and skins, a man may have to sit patiently at a hole in the ice for hours until a seal surfaces for air and he can harpoon it. Sometimes Eskimo men hunt for seal in kayaks, too. These kayaks are slender skin boats fifteen feet long with a hole in the top for the man. He keeps his harpoon ready on the deck of the boat until he can hurl it at a seal or other sea animal. After he has harpooned an animal he waits until it has tired itself out from dragging the sealskin float on the end of the line attached to the harpoon. Then he draws near to claim his quarry. Bear meat is also a favored food, but the bear is a dangerous animal to hunt. In the summer birds and their eggs are collected by the women and children to supplement the diet.

Transportation on land is by dogsled. In Greenland this sled consists of two runners about seven feet long crossed by thwarts set close together. At the back are two stanchions with a crossbeam on the top. Such a sled is pulled by about ten dogs hitched fan-wise. It can transport about eight hundred pounds under good conditions. A good team of dogs and a good sled are the Eskimo man's price and joy.

THE NATURE OF CULTURE

LIFE AT CAMP CENTURY*

Camp Century is a U. S. Army Post located on the Greenland icecap 800 miles from the North Pole. This icecap covers nearly the entire island and is composed of accumulated snow two miles deep.

Camp Century was founded for two general reasons. The first reason, a practical one, was to acquire usable knowledge. The military was interested in discovering new and better ways to build and run a base in the Arctic or in other cold climates. Consequently, a new method of under-snow construction was tested out in the building of Camp Century. The second reason, a scientific one, was to learn more about the Arctic and its phenomena. One experiment conducted for this second reason involved boring a hole through the Greenland icecap and taking out a core of ice. This ice core, some of it dating back to prehistoric times, was then analyzed. The rate of snow accumulation in prehistoric times was compared to the rate in later times in an attempt to discover what the weather was like thousands of years ago.

There are only two ways to get to Camp Century. One is by air, a dangerous thing to attempt since standard compasses are practically useless this far north and the continuous expanse of white gives the pilots no ground features by which to guide their planes. The other way, also dangerous, is by caravan. These Arctic caravans are called "swings." A "light swing" is a caravan of small passenger vehicles called "polecats." Bigger caravans, "heavy swings," are composed of powerful tractors with insulated cabs, "wanigans," mobile huts containing sleeping quarters or cafeterias or command headquarters, and other heavy machinery. Most of the camp supplies are brought in by these "swings," which spend three or four days on the trail coming to Camp Century from Camp Tuto.

The trails the caravans follow are marked by colored flags. At thirty-mile intervals there are huts stocked with food, clothing, and heaters. There are frequent Arctic storms, often with winds up to 50 mph, and a caravan caught in one of these storms must just radio for help and sit tight or try to reach one of these huts. It is dangerous to move far during a storm, however, for a "swing" which wanders off the trail might fall in a crevasse and never be heard of again.

Very little of Camp Century can be seen above the ground. Except for some ventilators and a few other things, all of this base is located underground in deep trenches covered over with hardened snow. These trenches were dug by large specially designed plows. The main communication trench at Camp Century is a long corridor of ice whose walls and roof are covered with wires and pipes. The ends of this tunnel open onto ramps leading to the ground. Branching out from this long tunnel are

*Information for the writing of this article has been drawn primarily from: Laugherty, Charles Michael. City Under the Ice. (New York: The Macmillan Company, 1963), and Wager, Walter. "Life Inside a Glacier." The Saturday Evening Post, Vol. 233, No. 11, Sept. 10, 1960, p. 24, 60-63.

THE NATURE OF CULTURE

Life at Camp Century

side tunnels in which prefabricated plywood buildings housing the activities of the base have been set up.

Camp Century is heated by a large power plant run by a nuclear reactor. This reactor splits the nuclei of uranium atoms and releases a great deal of energy. This heat energy is used to convert water to steam. The steam operates a turbine which runs the generator supplying power for heating, and fluorescent lighting.

Three shifts of about six men each run the power plant every day. Each crew must be ready to deal with emergencies such as the giving off of too much radiation or breakdown. Complete darkness, silenced communications, and broken water pipes would result from such a breakdown. To avert this catastrophe, there are reserve generators run by diesel power which can be turned on. It would be too expensive to store large amounts of diesel fuel, however.

The living quarters of the men who stay here consist of four-man cubicles containing double-decker bunks, a rug, wooden dresser, metal wall locker, mirror, straight chair, and an overhead lamp. The men also have offices and laboratories, a modern automatic laundry, a gymnasium, hot showers and flush toilets, a post exchange, a library containing 4000 volumes and subscribing to four newspapers, club rooms for both officers and enlisted men, a mess hall, and a hospital with an X-ray unit and operating room. Health needs of the men are fairly few, however, as the air so far north is very pure.

Drinking water for the camp is melted from ice by stream and distributed through a network of pipes which are insulated and which contain electric thermal wires to keep them from freezing. About 10,000 gallons of drinking water are consumed every day. It is so dry in the tunnel that the men develop a terrific thirst, so they consume a lot of fruit juice and soft drinks at meals as well as water.

Army cooks feed the men good food and lots of it, for this helps to keep up morale. During the construction of Camp Century the men needed a greater number of calories since they were working so hard. An ordinary breakfast might have consisted of tomato juice, bacon and fried eggs, pancakes and syrup, bread and jelly, hot biscuits with butter, and coffee. Lunch would have been several enormous hamburgers, macaroni and cheese, corn, lettuce salad with dressing, relishes, sliced peaches, coffee, milk, and lemonade. Dinner might have included steaks, mashed potatoes and gravy, peas, stewed tomatoes, lettuce salad, biscuits, cake, sliced pineapple, fresh fruit, grape juice, and coffee. Sometimes there was a fourth meal at midnight for men working on the late shift.

When the men go outside, a tremendous amount of heavy clothing is required to protect them from the cold. They are issued long underwear, wool ski socks, trousers and trouser liners, wool shirts, felt boots and rubber boots, a field jacket and a fur parka, leather gloves, two pairs of mittens, a thick cap, and sunglasses. Inside the buildings in the tunnels, however, it is warm.

THE NATURE OF CULTURE
Life at Camp Century

Life at Camp Century is monotonous. There seems to be no difference between day and night in underground living. Time is marked off by jobs done, meals eaten, and hours slept rather than by the progress of the sun, which can't be seen here. Hard work, the club rooms, the library, and nightly movies help to ease boredom and loneliness. Occasionally men can talk with families and sweethearts over a shortwave "ham" radio station. Mail from home is received whenever a plane or "swing" comes in. One time, though, due to storms, no mail was received for twenty-six days. Because of the psychological and physical strains of living at Camp Century, men are usually only assigned to Arctic duty here for periods of 180 days.

THE NATURE OF CULTURE

7. Read the following article and then answer the questions at the end:

Eskimos Today*

Greenland:

The Eskimos of Greenland have long had contact with European culture (since the time of the Norse voyagers and settlers). The way of life of many of them has changed so much as a result of this that the Eskimos of Greenland are usually called "Greenlanders" rather than Eskimos.

The "Greenlanders" have been converted to Christianity through a series of missions and trading stations. The exposure to Danish products has led to skin tents being replaced by canvas shelters and to changes in the clothing and food of the Eskimos. Now a range, couch, table, chair, chests, and cupboard are common household items in Eskimo homes. Possession of these things indicates more permanence of settlement and a decrease in migration.

Changes in the way of life of the Eskimos of Greenland have also come about as a result of environmental changes. In southwest Greenland, due to warming of the waters, seals do not frequent the area as much as they did in the past. Thus seal-hunting has ceased to be a common economic activity. Cod and other fishes come to southwest Greenland in abundance now, however, so a new commercial fishing industry has arisen.

New industries which have been added to Eskimo economy include mining and sheep raising. Another new industry involves hunting the Greenland shark, valuable for the oil from its liver. Hunting is becoming more efficient as motorized boats are replacing kayaks.

The Danish government provides for these Eskimos in many different ways. The Eskimo communities are governed locally by a representative council. Members on this council include the minister, trading post manager, district medical officer, post assistant, and elected Greenlanders. The Danish government also offers a social security plan, medical facilities, and schooling. (Everyone is literate in Greenlandic and 10-15% of the population speak Danish.)

It is the intent of the government to support the old hunting way of life. In northwest Greenland in the winter there are still ice hunting and open sea hunting of sea mammals, use of the dog sled, caribou hunting, and some subsidiary fishing.

*Information used in writing the following article has been primarily gleaned from "Under Four Flags: Recent Culture Change Among the Eskimos," by Charles Campbell Hughes. Current Anthropology, Vol. 6, no. 1, Feb. 1965, pp. 3-69.

THE NATURE OF CULTURE

Eskimos Today

The Angmagssalik Eskimos and Thule Eskimos were isolated from European or American influence longer than other groups and hence carry on many of the "old ways." They have also seen some changes in their way of life, however, the Angmagssalik Eskimos as a result of Danish developmental programs and the Thule Eskimos as a result of Knud Rasmussen's trading post and the Thule Air Base (U. S.)

Canada:

The Canadian Eskimos were isolated from "white" contact longer than other Eskimo groups. It is the culture of Canadian Eskimos that has generally provided the basis for descriptions of traditional Eskimo culture, which includes such characteristics as small dispersed settlements and seasonal migration (because of the limitation of game in a given local area), snow houses, sea mammal and caribou hunting, collecting, seasonal fishing, etc. (Among the Canadian Eskimos there never were-- except on Labrador-- permanent villages such as were found in western Greenland or on the Bering Sea coast of Alaska or Siberia.) Because of this long "isolation," greater changes have occurred in a shorter time (especially since World War II) in Canadian Eskimo culture than in Eskimo culture elsewhere.

Before World War II, there were mineral and oil prospectors, traders, and missionaries in Eskimo territories. The missionaries operated a number of welfare programs and schools. Through the traders the Eskimos were introduced to "white" goods and found a market for their fur pelts. Some of them began to congregate around trading centers.

Since about the time of World War II, the Canadian Department of Northern Affairs and National Resources has supplemented the welfare efforts of the missionaries and has provided the Eskimos with schools, medical centers, and relief payments to "tide them over" in difficult years.

After World War II, Eskimos began moving in larger numbers from their scattered settlements and congregating in more permanent villages. Three areas of such congregation were Frobisher Bay, the Mackenzie Delta area, and the shores of Hudson Bay. Between 1955 and 1957 the construction of the approximately 50 stations of the DEW (Distant Early Warning) line, which stretches from western Alaska to Baffin Island (about 3000 miles), prompted additional Eskimos to congregate around these stations. It also illustrated to the Eskimos the technological culture of the outside world and its degree of control of the environment.

The congregation of the Eskimos in larger settlements led to a number of things. One of these was an increase in their susceptibility to sickness. Tuberculosis became the worst killer of the Eskimos. (Before, the Eskimos had been like other "underdeveloped" peoples of the world, having high fertility and high mortality.) Also, Eskimos from many different small groups came together, leading to changes in some customs and to more intermarrying among more groups than had taken place before. Also, the smaller bands that had existed earlier had often consisted of a father and his wife, their sons, and their sons' families. Now, the relatives on the women's side, (as the relatives of the sons' wives), if they lived in the same community, became more important than they had been before.

THE NATURE OF CULTURE

Eskimos Today

Much of this congregating of the Eskimos was due to their desire for wage work. Wage-earning has created changes and conflicts in Eskimo values. Wage-earners may express contempt for traditional Eskimo ways and exhibit a high degree of acquisitiveness for things (which migrating Eskimos couldn't have too many of), but, on the other hand, they may not be able to adjust to set working hours and may long to get away and hunt.

Within one group of Canadian Eskimos today there may be both full-time hunters and full-time wage-earners. Traditionally, when all the members of group were hunters, game was shared among the group members. Today game is sometimes shared but money generally isn't shared, a rather unstable situation.

Eskimo hunting has seen a lot of changes over the years. Originally the Eskimos hunted just for their own food, clothing, and other necessities. They often hunted cooperatively, since they could be more sure of getting animals that way. The Arctic fox was considered a worthless scavenger. After traders came into Eskimo areas, Arctic fox pelts became valued as something which could be exchanged for desired trade goods. Only one man was needed to set traps and so the cooperative hunting declined some in importance. When the Eskimos started using rifles, the need for cooperative hunting was lessened even more.

There are also some ecological changes that have deeply affected Eskimo life. One of these is the depletion of game, particularly the caribou, which has taken place especially after World War II. In 1907, it was estimated that there were 30,000,000 caribou in Canada; in 1955, it was estimated that there were only 277,000. This decline in caribou is the result both of excess slaughter (use of the rifle) and of a decline in spruce-lichen forests, in which the caribou feed. Thus the Eskimos have had to depend a lot more on imported foods. Another effect of this ecological change is that there are fewer foxes, (Foxes feed in part on carrion provided by caribou.), and so trapping is disrupted.

Another problem related to the caribou and to reindeer is the result of atomic testing. The caribou and reindeer have become somewhat contaminated by radioactive fallout. The lichens and sedges on which they feed show very high radioactive counts.

Relocation is being used by the Canadian government in some cases to improve the Eskimos' way of life. In some areas, where there are sufficient sea mammals and caribou, Eskimos are being persuaded to leave congested large centers and return to the older way of life. Resolute and Craig Harbor are two such "new traditional settlements." Some of the Eskimos at Craig Harbor had never even seen walruses and caribou before they were relocated! In other areas, relocation involves moving Eskimos away from areas in which there is little game left to southern Arctic centers.

The Canadian government has also attempted to encourage the development of new industries among the Eskimos. Sheep-raising and reindeer-raising were introduced with little success. Attempts have been made to manage game better and to exploit fish commercially. Canneries have been established. Eskimos have been encouraged to produce Eskimo arts and crafts for a popular and tourist market. (This has been quite successful, though Eskimo carvers feel that carving all the time becomes monotonous.)

THE NATURE OF CULTURE

Eskimos Today

Alaska:

The Eskimos of Alaska have had more and longer contact with the "white man" than the central Canadian Eskimos. Starting about 1848 and becoming heavier at the end of the century, there was intensive commercial whaling in the North Pacific and Bering Sea area. Changes occurred in Eskimo culture as the Eskimos came in contact with lawless sailors, both Russian and American, and various diseases. Much of their game was killed. With the trade that occurred, the Alaskan Eskimos got metal tools, firearms, knives, imported fishing gear, etc., long before the Canadian Eskimos.

A lot of the changes that occurred were changes in the content rather than in the pattern of Eskimo culture. The Eskimos had used good-sized boats with crews for whaling before; after contact they continued using crews but the crews were better equipped. The equipment adopted included a combined darting gun and steel-headed harpoon, a wooden whaleboat, manila rope, and, in the 1920's, a motor for the whaleboat. In southwest Alaska the fish wheel was adopted as a more efficient means of catching salmon. The rifle was readily adopted by individual hunters. (There had not been as much cooperative hunting in Alaska as there had been in Canada.)

Even before contact (as well as after), the way of life of most Alaskan Eskimos was different from the way of life of most Canadian Eskimos. In Alaska, in contrast with Canada, there was a ceremonial, work, and recreation house (used mostly by men) in most villages. Also, there was a more elaborate and more regularized public ceremonial cycle. The Alaskan art styles were more elaborate and more numerous than the Canadian. The extended family groupings and the settlements were more permanent throughout most of the year. Also in contrast to Canada, there were fewer Alaskan Eskimos dependent on caribou herds for subsistence or fox pelts for cash.

By the 1890's, missions were established among the Eskimos. The U. S. government set up schools run by the Bureau of Indian Affairs. Before World War II most Eskimo villages contained a missionary, teacher, and occasionally a trader and a nurse. In the 1920's and 1930's, representative councils (self-government) were set up in the villages. The U. S. government attempted to rehabilitate and stabilize villages and operated a number of welfare programs. During World War II many men and much material passed through Alaska and many Eskimos served in the U. S. military forces.

Since the early contacts with the white man, the economies of Alaskan Eskimos have seen a lot of changes. They have gone from subsistence hunting, fishing, and collecting to a deeper and deeper involvement in a money economy and production for sale. At first ivory, sea mammal skin, and baleen were the items sold. Then fox pelts came to the fore. After World War II, the fox tapered off. In several areas today the trapping and selling of mink and muskrat skins is a regular source of income. Some attempts were made to import Asian reindeer with Chuckchi and then Lapp herders to instruct the Eskimos in raising reindeer. In the long run, however, reindeer herding has not been successful among the Eskimos.

THE NATURE OF CULTURE

Eskimos Today

Handling and earning money is not new to the Alaskan Eskimos, though its use has greatly increased since World War II. Money was formerly obtained through the sale of pelts or crafts; now it is primarily obtained through wages, salaries, or welfare and aid payments. The trapping and fishing still continues, however, and the sale of crafts has increased in recent years.

The most dramatic intrusion of wages came with the establishment of large-scale military projects, such as the DEW line and the U. S. Navy's petroleum installation at Point Barrow. With the wages have come demands for new services and luxuries--movies, stores, etc. Few Alaskan Eskimos still live in "aboriginal" houses. Their material culture is like that of "white" Alaskans, though older people still eat large quantities of caribou and sea mammal meat. Eskimo children are demanding more education so they will be better off economically later on.

There is a trend among the Alaskan Eskimos toward fewer and larger settlements. Many inland Eskimos have moved to the coast. Earlier there had been trade between the coastal and inland villages (sea mammal oil for caribou hides), but this dropped off when imported textiles became common on the coast and the whales and walruses declined. (Thus today the caribou herds have increased since there are relatively fewer Eskimos inland.) Many Eskimos have moved to the urban areas of Alaska and some have even moved into the "southern forty-eight." The U. S. has made little attempt to relocate Eskimos in environments similar to their traditional ones as Canada has done.

There have been a number of recent changes in Eskimo life. In some areas the extended family is still the important economic and social unit, but in other areas individualization has set in. Now even the members of a whaling crew are not necessarily related. Husband-wife ties have become relatively stronger and father-son ties relatively weaker. The men's house has almost disappeared and other integrative centers, such as the church, school, coffee-house, movie theater, and store, have taken over its functions. New leaders are often those who have had education and who can handle English well rather than whaling captains or traditional religious leaders, (though whaling captains are often still the leaders in the north). As there is more travel and exposure to the outside, people don't marry within the village as much as they used to. Gains have been made in recent years in controlling tuberculosis and the death rate has declined somewhat.

Siberia:

The Eskimos who live in Siberia on the western shores of the Bering Sea have also seen some changes in their way of life due to contact with "white ways." As in Alaska, whaling ships and fur traders stopped and dealt with the natives. American influence of this sort was strongest between the mid-1800's and the 1920's. Contacts and visiting between these Eskimos and the Eskimos of Alaska, however, were relatively frequent until the 1930's and continued as late as 1944, when they were strongly discouraged by the Soviet government.

THE NATURE OF CULTURE

Eskimos Today

The Siberian Eskimos were long neglected by the Tsarist government. It wasn't until the Communist Revolution that Russians took an interest in changing the Eskimos' way of life. In 1925 schools giving literacy, technical and political instruction were established, and in 1928 large scale cultural and sanitation work and a cooperative were begun. The first Eskimo collective, "Novaya Zhizn," was started. With collectivization work groups were organized for such activities as reindeer herding, fishing, and hunting. Health and sanitary facilities were improved, and local political groups were established. "Plans" were set up to increase production.

The present-day economy of the Siberian Eskimos is primarily based on reindeer herding and sea-mammal hunting. There is also some trapping and processing of useful products from animal skins. The government has tried to improve reindeer herding by organizing workers into "brigades" and by establishing special schools to teach better herding methods. Better technical equipment (motorized whaleboats, ammunition, better hunting weapons, etc.) has been supplied to the Eskimos to make the sea-mammal hunt more efficient.

The collective Novaya Zhizn provides an illustration of this way of life. In the winter the hunters in this collective hunt seals individually. Thirty percent of each kill is given to the collective and 70% is kept by the hunter for his family. Whale boats and schooners for hunting walruses are furnished by the government. The walruses are killed with lances so they won't be frightened away by gunshots. Brigades of 4 to 6 men trap foxes. Fishing is not highly developed in this collective but some salmon and navaga are caught with seines and stationary nets. The women of the collective gather wild products, catch fish, and process the sea mammals.

These Siberian Eskimos live mixed in among or very near coastal Chukchis and most Eskimo adults speak Chukchi. Among them until recently were fully developed patrilineal clans (related in the male line). Their residence pattern was similar to the residence pattern of the Angmassalik Eskimos--one large dwelling was inhabited by several families.

Recent years have seen the construction of one-family wooden houses; seven years of education for all in Eskimo and then in Russian; the establishing of schools to train such specialists as collective leaders, radiomen, and mechanics; medical clinics and three hospitals on the coast. Handicrafts made by the Siberian Eskimos today include the traditional bone carving and reindeer hair and thread embroidery. The Russians discouraged all traditional native religious beliefs and practices, but some of these still existed as recently as ten years ago. Are traditional criteria for membership in groups still operating? It would be interesting, for instance, to know whether boat crews are still made up of clan members. This data is not now available, however.

THE NATURE OF CULTURE

7 (continued)

- a. Use the following chart to illustrate some of the differences existing among different groups of Eskimos today. Fill in to the left the characteristics you wish to compare.

Characteristic	Greenland Eskimos	Canadian Eskimos	Alaskan Eskimos	Siberian Eskimos

- b. Why do you think these differences exist? List your reasons below:

(1)

(2)

(3)

(4)

(5)

(6)

(7)

THE NATURE OF CULTURE

- c. What are some changes which have been readily adopted by Eskimos? Have any other changes resulted from these? What?
- d. Does what you learned about Eskimos today support or refute any of the generalizations you made about the relationships of culture and environment? Which ones? Explain.

- 8. Read Parts 1, 2, and 3 of "In the Wake of the Wheel" by Wesley Bliss, pp.23-27 in Edward H. Spicer, Ed. Human Problems in Technological Change. You may use this space to take notes on your reading.

Answer the following questions:

- a. In what ways (for what activities) do you think the Papago Indians used the wagons?
- b. What are some of the changes that having wagons brought to Papago culture?
- c. Why do you think wagons were readily adopted?

THE NATURE OF CULTURE

- d. Now read parts 4 and 5, pp. 28-32, of "In the Wake of the Wheel." In the space below revise and expand your answers to questions a, b, and c.

9. As a class, choose one new thing or way of doing something that might be introduced into and adopted by people in our culture.

The class chose _____.

Now list as many changes in our culture as you can that would result from the adoption of this new thing or way of doing something.

THE NATURE OF CULTURE

10. Read the article "Culture and Society" by Ina Corinne Brown and write in the space below some of her ideas and generalizations about culture. Compare these with the ones you have listed on page 1.

11. Can you think of any additional statements which could be made about culture or cultures? If so, write them on page 1.

EARLY MAN

Introduction and Teacher Background

COURSE II, UNIT II - CULTURAL DEVELOPMENT

Section 2 - Early Man and His Culture

ANNOTATED BIBLIOGRAPHY*

Brace, C. L. and M. F. Ashley Montagu. Man's Evolution (New York: The Macmillan Company, 1965).

This readable book is recommended to all teachers as important background reading. The authors' interpretation of fossil evidence is presented very clearly, but, remember, not all experts agree with this interpretation.

Clark, W. E. Le Gros. The Fossil Evidence for Human Evolution (Chicago: The University of Chicago Press, 1955).

Additional information on the hominid fossils may be obtained from this book. Parts of it would be difficult reading, however.

Dobzhansky, Theodosius. Mankind Evolving (New Haven and London: Yale University Press, 1962).

The author of this book is a world-renowned geneticist. The book is an excellent text on all aspects of man's evolution (past and present) and also deals very well with the topic of race.

Hibben, Frank C. Digging Up America (New York: Hill and Wang, 1960).

This book is written in a conversational, novelistic style and may be read by students. It deals with early man in the New World as well as with archaeological techniques.

Howell, F. Clark and The Editors of Life. Early Man, Life Nature Library (New York: Time, Inc., 1965).

This is an excellent book, highly recommended for both teachers and students. It contains up-to-date information and many excellent illustrations. Your school library should possess this book and you may want to purchase it for your own personal library. Note especially the explanation of speciation on pp. 124-125. This information may be useful to you later in this unit as well as here.

Howells, William. Back of History, Anchor Books (paperback), (Garden City, New York: Doubleday and Company, Inc., 1963).

This book would be one of the best available sources of data for teachers on man's prehistory.

*The question of man's origins and what the earliest men were like has been an absorbing one for thousands of years. The books and articles listed here are only a few of the many books which have been written on this topic.

EARLY MAN

Introduction and Teacher Background

Korn, Noel and Harry Reece Smith. Human Evolution (New York: Henry Holt and Company, Inc., 1959).

Within this book are numerous readings dealing with various aspects of the evolution of man. The book is biologically oriented.

Linton, Ralph. The Tree of Culture (New York: Alfred A. Knopf, 1961).

There are several chapters at the beginning of this book that deal with early man. You should already have this book in your professional library.

Scientific American. September 1960.

This issue of Scientific American contains a number of articles dealing with evolution and early man. A reprint of one of the articles is to be used as student reading in this section. You will want to read the other articles, too.

(Reprints from Scientific American can be ordered from: W. H. Freeman and Company, 660 Market Street, San Francisco 4, California.)

Simpson, George Gaylord. The Meaning of Evolution (New Haven and London: Yale University Press, 1962).

This book, a paperback, deals with evolution in general, starting with the very beginnings of life. It deals with man's place in nature and examines human aims and ethics in the light of the evolutionary picture.

EARLY MAN

Introduction and Teacher Background

ADDITIONAL ACTIVITIES

Quite a number of fossilized bones of the early hominids have been found. Perhaps a museum near your community would have a display of casts of these fossils which your students would like to see. There may also be dioramas picturing the way of life of early man which your students could view.

Perhaps several students in your class would like to construct a diorama or draw a picture showing some of the activities early man engaged in.

You might want to invite a science teacher to speak to your class on natural selection or on evolution in general. To get into the genetics of evolution is probably too complicated at this time, so it would be best to let this topic wait until your students take biology.

FILMS

Lascaux: Cradle of Man's Art. University of Illinois: (wich; ifb), j-h-c, 18 min., 51565, color: \$6.15. University of Indiana. 18 min., sd, color, RSC-350: \$6.15.

Begins with the story of two boys finding a cave in which are paintings made by Cro-Magnon men. Discusses the paintings in terms of the way of life of Cro-Magnon man. A beautiful film.

The Story of Prehistoric Man. University of Illinois. (c), j-h, 11 min., 02741, bw: \$2.35, or 02742, color: \$3.80.

Film traces cultural developments of man in the Old and New Stone ages, discussing such things as the use of fire, the chipping of stone, community living, etc. Deals mostly with Europe. The film is quite simple but might be used if your students are having trouble understanding some of the basic inventions and cultural developments of man before the advent of what we term "civilization." The film does not discuss the relationships of culture and evolution.

Another film, Man and His Tools, was reviewed and was found too elementary for our students.

EARLY MAN

Introduction and Teacher Background

TEACHER BACKGROUND

Before you start this unit with your students, read Man's Evolution by Brace and Montagu and Early Man, Life Nature Library. Then read through the whole unit. You will need this background.

The unit is organized around the following five topics:

1. the origin of man,
2. early man,
3. culture and structure in man's evolution,
4. natural selection,
5. the spread of man with his hunting and gathering way of life.

It is recommended that you use the following articles by L. S. B. Leakey in the National Geographic for data on the origin of man:

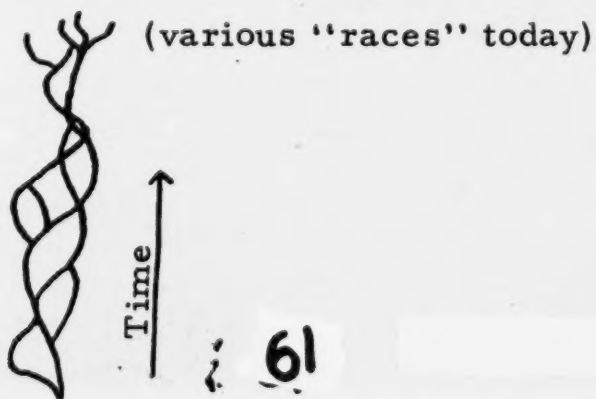
1. "Exploring, 1,750,000 years into man's past," vol. 120, 1961, pp. 654-589.
2. "Finding the earliest man," vol. 118, 1960, pp. 420-435.
3. "Adventures in the search for man," vol. 123, 1963, pp. 132-152.

Data on early man and his way of life may be gleaned from the Leakey articles. The article "Early Man in Africa" by J. Desmond Clark (Scientific American reprint, July 1958) is also a good source of data on the early hominids. See also Early Man, Life Nature Library.

The article "Tools and Human Evolution" by Sherwood L. Washburn (Scientific American reprint, Sept. 1960) contains a lot of data bearing on what early man and his culture were like. It will be the primary piece of data in this "Early Man" section and we will refer to it again and again. Have your students give careful attention to the illustrations in the article, particularly the following ones:

p. 6 - Note the extremely long period of time it took man to develop very simple tools in contrast to the time it took him to progress once he had discovered food producing (Mesolithic, Neolithic), metal-working, etc.

p. 7 - This branching diagram would tend to indicate that Peking man, Neanderthal man, etc., became extinct, but that a line of men continued, eventually leading to Homo sapiens. This may not be the case. These various types of men are represented by one or more fossil finds. There is a "steady" progression in these fossils toward modern man. Thus perhaps the chart should really look something like this (with all the "lines" intertwining):



EARLY MAN

Introduction and Teacher Background

pp. 8, 9 and 12 - Ask your students to look closely at the skulls represented and compare them. They should see that there are gradual changes in the skulls and jaws. The Taungs skull, by the way, is most likely the skull of a child.

p. 10 - Note the gradual refinement of tools. The tools of the upper Paleolithic were not developed overnight.

p. 11 - Bipedalism has been extremely important in the evolution of man. Even yet we are not fully adapted to bipedal (on two feet) locomotion as indicated by the fairly high incidence of back trouble among us.

pp. 14 and 15 - Note how much, relatively, of man's brain is involved in speech and in fine hand movements.

There are articles on natural selection and the spread of man included in the manual. Data pertaining to culture and structure in man's evolution will be gleaned primarily from the "Tools and Human Evolution" article.

The concept "natural selection" can be reinforced in the next section, "The Food Producing Revolution." The process applies to plants and animals both as well as to man.

In discussing early man's hunting and gathering way of life, you might want to ask your students to compare this way of life with the way of life of the traditional Eskimos as described in the first section of this manual. No people today lives exactly like early man did as all cultures change, but some insights into the life of early man can be drawn by studying the cultures of hunting and gathering peoples today. See Early Man, Life Nature Library, for further information on this.

EARLY MAN

RECOMMENDED TIME TO SPEND WITH THIS SECTION: 4 days

1. Ask your students where they think man originated. Have them write their guesses in their manuals and then put some of the guesses on the board.

23

Ask one or more of your students to read and report on the articles by L. S. B. Leakey in the National Geographic.

Articles

1. "Exploring, 1,750,000 years into man's past," vol. 120, 1961, pp. 564-589.
2. "Finding the earliest man," vol. 118, 1960, pp. 420-435.
3. "Adventures in the search for man," vol. 123, 1963, pp. 132-152.

They should consider the following questions: "What is Dr. Leakey doing and what is the significance of his work? How is he going about it?" Perhaps they would want to bring the articles to class so their classmates can see some of the pictures with the articles.

If your students are interested in exploring further the nature of the culture of early men and the archaeological work which has been done on this, you may refer them to the Scientific American reprint "Early Man in Africa" by J. Desmond Clark (July 1958). Early Man Life Nature Library, also contains a great deal of data on this topic. The article, "Tools and Human Evolution," which your students will be reading, also deals with this.

Reading

Ask your students to read the article "Leading up to Modern Man: One Interpretation of the Fossil Record." Also ask them to study the illustrations on pages 6, 7, 8 and 9, and 12 in the "Tools and Human Evolution" reprint.

Have your students answer the questions and fill in the chart in their manuals. Help them to understand that the evolution of man was a slow, gradual, continuous process. There were really no sharp breaks from one "stage" to another. The apparent "jumps" from stage to stage are only due to discontinuities in the fossil record to date. There are periods of thousands of years for which we have found no fossils. Beware, therefore, of the way your students use the word "extinct."

What is meant by "becoming extinct," anyway? This phrase does not necessarily mean that a whole species or group of individuals suddenly died out. It may mean that, over a period of centuries or millennia, this species had changed to such an extent that it could be said to be a new species. Then the old species is said to be extinct. In truth, the members of the old species had contributed to the heredity of the new species; they had not suddenly died out without reproducing.

EARLY MAN

If your students are interested in the different types of fossil hominids, you might have groups of students study further about the fossils represented in the different "stages" of Brace and Montagu. Early Man, Life Nature Library, has especially good articles on Homo erectus and on Neanderthal. Their articles on the Australopithecines may indicate too complete a break between the Australopithecus and Paranthropus forms. Bearing this in mind, the articles may be useful. Perhaps several students would like to attempt clay reconstructions of early hominids. Perhaps they would like to build dioramas showing their way of life.

If your students are interested in what came before Proconsul, you might have several students give reports on evolution in general and on the Primates in particular. There are many possible sources for this information. The Time-Life books Evolution and The Primates are recommended. Your school's science teachers would be able to suggest additional references. But do not spend a great deal of time on this, as we, in this course, are primarily concerned with man himself. Thus the focus should be on man's immediate ancestry.

You might ask your students why they think some of the changes occurred from stage to stage. There can be a wide variety of answers to this question. Take note of your students' comments and include some of these comments on the commentary pages that you will return to SSCSC.

26

2. Ask your students to read the article "Tools and Human Evolution" and answer the questions about the article in their manuals.

Reading

As you discuss the questions with them, help them to understand that the biological and the cultural went hand-in-hand in the evolution of man. They are interdependent. Their interdependence can be understood when we consider that they both serve the same function--the adaptation to and control of man's environment. Because the early hominids developed tools, a complex social life, and speech, their brains became larger; because their brains became larger, they could develop more complex tools, social life, and speech. A change in man's behavior affected his structure and vice versa. Man adapted his culture to suit his physical makeup; and man's physical makeup was adapted, through natural selection, to suit his culture.

Watch for and correct student responses that emphasize only one side of this evolution or that are overly deterministic (such as, because of X, Y happened).

Some students may become especially interested in the kinds of tools used by the ancestors of modern man. Note the descriptions in Early Man, Life Nature Library, of how these tools were made and used. Students may want to try making tools like these themselves. They could use them in the archaeological excavations suggested in the next section on archaeology. Also, the making and experimental

EARLY MAN

using of such tools would make a good science project. (Last year, at the Junior Academy of Science State Science Fair, there were two projects on archaeological methodology, one from Marion and one from University High School, Urbana.)

3. Ask your students to explain how evolution happens. Do they know? Have them state their hypotheses. Then assign the article "The Process of Natural Selection."

27

How does evolution happen? It happens by natural selection.

Natural selection is an extremely difficult and complex topic. It is also fascinating. You may run into some problems in discussing it with your students, so be sure to have read Chapter 2 in Brace and Montague Man's Evolution (and anything else you can find that is relevant).

Note on page 3 of the article that the question of heredity and environment is mentioned. Don't let your students run wild on the question of heredity versus environment. The new idea regarding heredity and environment is that their effects are so intertwined that it cannot really be ascertained whether something is more the result of one or the other; it is just the result of both.

As you discuss natural selection with your students after they have read the article, endeavor to help them understand that natural selection involves a continuing process of change. Also, natural selection is not just something that applies only to plants and animals and early man. It applies to us today, too.

This article should raise a lot of questions in the minds of your students. A lot of these questions have no answers yet. Research has not and perhaps cannot supply them. Tell your students this.

Be sure to send descriptions of student reactions to and questions about the article, some of the ideas and questions they had about natural selection, and some statements about your problems or successes in using the article and leading the discussion of it.

4. Ask your students to think about and formulate answers to the following questions: How was man able to spread so readily into so many different environments? (He used his culture to adapt.) Why did he spread? (He sought the resources to fulfill his needs. When people got so numerous in one spot that not all men could get the resources they needed, some men moved on to new locations.) When did man come to the New World and how did he get here? Draw out your students' ideas regarding these questions and then assign the following article in their manuals.

31

EARLY MAN

5. Your students have now learned something about how modern man came to be and about the physical characteristics and way of life of his early hominid ancestors. Have they any unanswered questions? Please have your students write down their questions and send the most thoughtful of these to SSCSC. The questions students have show their depth of understanding. These are some samples of student questions:

How can modern man be smarter and yet have a smaller brain than Neanderthal? (brain complexity, probably)

How can there be so much variation in a population? (This would get into genetics and mutations, etc., very complex topics.)

Can natural selection change a culture? Does it happen to everything?

What happens if selection pressure stops?

Why do some individuals adapt better than others?

Will all apes evolve to be men? (This question leads deeper into evolution than we have gone. Apes have evolved, too. They are specialized for a certain way of life.)

Can man by cultural means control natural selection?

6. Ask your students how we find out about man's ancestors and what their ways of life were like? Where does our information come from? This will serve to draw out what your students know (or don't know) about archaeology and will provide a bridge between this section on Early Man and the next section, Archaeology.
7. MAKE SURE THAT YOU HAVE FILLED IN ALL THE INFORMATION AND COLLECTED ALL THE DATA REQUESTED. THEN SEND THESE PAGES AND THE REST OF THE DATA TO SSCSC.

EARLY MAN

1. Where do you think man originated?

Read the following article, "Leading up to Modern Man: One Interpretation of the Fossil Record," and study the illustrations on pages 6, 7, 8 and 9, and 12 in the "Tools and Human Evolution" reprint. Be prepared to discuss the following questions in class:

- a. What are the characteristics which have been considered important in distinguishing the early men of one stage from those of another? List them below.
- b. Fill in the chart in the space below, indicating the physical and cultural characteristics in the stages indicated:

Characteristic	Australopithecine	Pithecanthropine	Neanderthal	Modern

- c. Looking across the chart you have filled in, can you make any guesses as to why some of the changes occurred from stage to stage?

EARLY MAN

Leading up to Modern Man: One Interpretation of the Fossil Record*

The fossil evidence for human evolution may be divided into six groups: Proconsul, Ramapithecine, Australopithecine, Pithecanthropine, Neanderthal, and Modern. These groups represent different stages in man's development.

About fifteen million years ago, there existed in East Africa a kind of generalized ape known as Proconsul. The best-known fossil of this ape, almost a complete skeleton, is about the size of a man. Proconsul lived partly in the trees and partly on the ground, not being specialized for either way of life.

About ten million years ago, the first man-like creature or hominid, known as Ramapithecus, lived in East Africa and also as far from this area as India. Man-like creatures were spreading out geographically. Two upper and one lower jaw of this hominid have been found.

Remains of the Australopithecines have been found in East Africa, South Africa, the Lake Chad area, Palestine, and Java. These hominids existed as early as two million years ago. They had relatively large molars compared to the molars of modern men, and they lacked the projecting canines typical of apes. The pelvis of the Australopithecines was almost like the pelvis of modern man, so we know they could walk "erectish" for fairly long distances. Their cranial capacities were generally at or below 650 cc. (The brains of anthropoid apes today may get this large, but it must be remembered that the Australopithecines were smaller than anthropoid apes today, and so their brains were proportionally larger in relation to their body size.)

The Australopithecines used culture as their major means of survival. They used tools of stone (mainly river pebbles with some chips knocked off). There were two types of Australopithecines--an earlier, smaller, and lighter type called Australopithecus and a later, larger, and heavier type called Paranthropus.

By about 400,000 years ago, another form of hominid had come to the fore. This new type of early man has been called Pithecanthropus (or Homo erectus). The Pithecanthropines had larger brains (about 900 cc) in proportion to the rest of their bodies than the Australopithecines. Their molars were smaller than the molars of Paranthropus and fall within the upper size limits of the molars of modern man. Their skeleton below the neck was pretty much like modern man. They really did walk erect. The greatest number of Pithecanthropines have been found in the Far East, though some have also been found in Africa and Europe. The first Pithecanthropine fossil was found in Java in the 1890's by a man named Dubois. Probably the most famous Pithecanthropine fossils were found at Choukoutien cave near Peking, China. This cave showed evidence of consistent use as a campsite in Pithecanthropine times, indicating that there was some division of labor taking place. ("You go that way and I'll go this way to look for food and we'll meet back at the cave.") Also, and even more important, there are indications that the Choukoutien cave-dwellers, called "Sinanthropus," knew how to use fire. With fire, man's ancestors could move into colder areas and could occupy rock shelters and caves in safety. (Before, caves sometimes became traps.)

*The information used in writing this article was primarily drawn from Brace, C. L., and M. F. Ashley Montagu, Man's Evolution. (New York: The Macmillan Company, 1965).

EARLY MAN

Leading up to Modern Man

By about 150,000 years ago, before the last big glaciation, Neanderthal-type men were inhabiting much of the Old World south of about 60° N except for some desert and tropical forest regions and for some of the islands south and east of Asia. Many of the remains of Neanderthal men have been found in Europe. When a lot of people think of the name "Neanderthal," they think of a hairy, stooped-over creature with a gorilla-like face and a blank expression who is sporting an animal skin held up by a strap over one shoulder and is lugging a large stick like an enormous baseball bat. This picture of Neanderthal man is absolutely incorrect. Neanderthal man stood just as erectly as modern man. His cranial capacity was 1500 cc, larger than modern man's (1350 cc). The only significant differences between Neanderthal and modern man were in the face and teeth. Neanderthal had a larger face with larger brow ridges and larger front teeth than modern man. He used his teeth so often and for so many things, though, (perhaps even for softening and tanning animal skins), that they often got very badly worn down.

Neanderthal men were able to survive in the temperate zone in some numbers even during the last glacial period. They lived in rock shelters and caves and undoubtedly used clothes as well as fire to keep warm. During the time of Neanderthal, there was an increase in the number and variety of cutting and manipulating tools, Neanderthal was also the first type of early man known to bury his dead. Also, the faces and parts of the bodies of the dead were painted with red ochre. Perhaps the Neanderthals had a system of religion and some belief in an afterlife.

Evidence of the first appearance of modern-type men, Homo sapiens, is sketchy. There is also the problem of where one should draw the line between Neanderthal and modern men. It is evident, though, that, from the time of Neanderthal, there was a decrease in skeletal robustness, a decrease in the part of the face related to the jaws and teeth, and the development of an overbite. With metal utensils to cut meat and more vegetable food in the diet as a result of the agricultural revolution, man didn't need the edge-to-edge bite as much.

EARLY MAN

2. Read the article "Tools and Human Evolution." After you have read it, answer the following questions:
 - a. What changes occurred in man's physical structure during the course of evolution? Check p. 75. List the changes below.
 - b. Choose one change you listed in a. above and describe how this change helped man to adapt better to his environment.
 - c. What advantages did tool use confer on early man?
 - d. In the article it states that "Tool use is both the cause and effect of bipedal locomotion." (Remember, bipedal locomotion refers to walking on two feet.) How can it be that tool use is both cause and effect? How would you explain this quote from the article in your own words? You may want to use examples in your answer.
 - e. Prepare a summary statement about the relationship of man's physical nature (his body structure, etc.) and his culture in his evolution. Indicate by giving examples, how the data of man's evolution upholds your statement.

EARLY MAN

3. a. How does evolution happen? On page 3 of the article "Tools and Human Evolution," Sherwood Washburn speaks of "the change in terms of natural selection." On page 9, he states, "Selection is based on successful behavior." He says that the success of the new way of life of the man-apes changed the "selection pressures." What do you think is meant by the term "natural selection"? Write your ideas below. You may find that giving some examples will help to clarify your ideas.
- b. Choose one physical characteristic which changed as man evolved. (Pick a different one from 3b.) Describe how natural selection was operating to favor this change. In other words, what were the selection pressures favoring the change? Why didn't the old characteristic continue?

EARLY MAN

The Process of Natural Selection

What is natural selection? It has been said that natural selection is the process by which evolution operates. What does this mean? Let's look at some examples of natural selection in operation.

In California the scale insect attacks citrus trees. For a time hydrocyanic acid was effective in killing most of these insects, but after a time insects resistant to the acid began to multiply and pass on the resistance to acid to their children. These acid-resistant insects made up a larger and larger proportion of the scale insect population. The acid was no longer effective in controlling them. The same thing has been found to be true of flies and DDT and of viruses and penicillin. The DDT and penicillin seem to have lost their effectiveness and more powerful poisons and antibiotics must be used.

In industrial areas in England some years ago, it was noticed that the dark colored moths found in populations of mainly light-colored speckled moths were increasing in numbers. Soot from the industries had blackened the tree trunks where the moths alighted, and birds could see and catch the light colored moths more easily than the dark ones. Thus more of the dark moths lived and passed on their dark color to their offspring. The light moths no longer "blended in" and so not as many of them as before lived and passed on their lighter color to their offspring.

What can we glean from these examples that will help us to understand natural selection? First, it can be seen that there is always a wide range of variation in any population. There had to be, originally, at least a few scale insects resistant to hydrocyanic acid and at least a few dark moths for these resistant scale insects and dark moths to be able to increase proportionally in the populations of scale insects and moths. We can look around us and see a wide variation in people, too. Among us are light-haired and dark-haired, dark and light-complexioned, intelligent and not-so-intelligent people. We come in all shapes and sizes. This was probably true of our ancestors, too.

It can also be seen from the above examples that some individuals adapt better in their physical characteristics to their environmental situations than others. The DDT-resistant flies adapted better to an environment containing DDT. The dark moths adapted better to the soot-blackened trees. This is true with people, too. Some people have hereditary diseases such as hemophilia (a disease in which the blood does not clot as it should) and pass these diseases on to their children. These children are not as well adapted to an environment in which they might cut themselves as children who don't have the disease. Skin color in people is adaptive, also. People with dark skins can get along better where there is a lot of intense sunlight than people with lighter skins. Those of you who are very fair-skinned and blue-eyed, . . . what would you look like and how would you feel if you had to spend even a full week in intense sunlight?

There are always more individuals born in every population than can live. Every organism needs food and other resources in order to live. Resources are limited. So what happens? Some individuals die. Those individuals who die are just not able to adapt to their environmental situations. Some people, for instance,

EARLY MAN

The Processes of Natural Selection

may be born with variations such as malfunctioning kidneys or defective hearts that will not enable them to carry on bodily processes necessary in the kind of environment in which we live.

Natural selection has been called the "survival of the fittest." This term plagued Charles Darwin, who so amply documented the workings of natural selection in his book The Origin of Species, published in 1859. The term probably partially results from the ideas of Malthus regarding human populations. Malthus had noted that in the England of his day there were natural checks on human population. These checks were disease, wars, and poverty. Only the "fit" could survive.

In evolutionary terms "fitness" means something different from the way we use the word in everyday speech. When we usually use the word, we are referring to "being in shape," being strong, or being well. In evolutionary terms, however, "fitness" refers to reproductive fitness. Thus the fittest viruses were those that lived and reproduced. The fittest moths were those that reproduced, passing on their dark color to their progeny. This is true of people, too. Those who are the "fittest" in Darwinian terms are those who have the most healthy children who have the most healthy children, etc. A man may get along well in his environment, but if he has no children, his physical characteristics will not be passed on to future generations. Thus the reproductive success of a species--any species--determines the future of the species.

We think in terms of large populations when we think about how natural selection operates in evolution. We spoke earlier about how DDT-resistant flies were increasing proportionately in the populations of flies exposed to DDT and about how dark colored moths were increasing proportionately in the total moth population. The same thing works for human beings, but our human generations (reproductive life spans) are so long that it is difficult for us to see natural selection in operation in human populations except among small breeding groups that have been isolated from other people.

Natural selection is really a very complex process. Think of all the different kinds of living things in the world. All living things are undergoing natural selection. They are continually adjusting to each other. When the situation to which a population of insects or dogs or people is adapting changes, then the process of natural selection operates to change the population to fit the new situation. This means that other kinds of living things in the same environment have to change, too. When man-apes first learned to use tools with their hands, selection pressures relaxed for large canine teeth and favored hand-eye coordination. The man-apes could throw stones to defend themselves and to kill game instead of relying on slashing with their teeth. So more man-apes with small canine teeth lived and reproduced, and gradually large canines began to disappear from the population. (We don't need them today, either; we use bombs and machine guns.) Man-apes could kill more animals with stones than they could with teeth, so their diet includes more meat and less vegetation. This meant that animals had to become wiler or swifter--better able to get away from man--in order to survive. It also meant that more plants could grow longer and proliferate.

EARLY MAN

The Process of Natural Selection

The process of natural selection operates on an extremely large number of traits at the same time. Sometimes the forces favoring one trait are operating against another trait. Thus the various features of the organism must reach a compromise.

You may wonder whether the forces of natural selection even operate on man any more. After all, man can adapt to his environment via his culture. He can cover fair skin with clothes and can protect his body from the cold by building and heating houses. And, what is more, he can pass on knowledge of how to do things by cultural means. Man learns. He doesn't have to rely on genetic transmission. Or does he?

Tuberculosis spreads faster among people when they are crowded close together, as they are in many cities. People in the cities who would be most "evolutionarily fit" would be those who are resistant to tuberculosis. Is man gradually becoming more resistant to TB?

Also, when people live close together, they must be able to cooperate with each other. Are the forces of natural selection operating to increase man's ability to cooperate? Some individuals, though, seem to make their way by being aggressive and uncooperative. They have children, too. Are the forces of natural selection operating to perpetuate this kind of behavior? How much is behavior controlled by heredity?

With all the advances in technology in our society in recent years, it is more and more necessary to have advanced training to get a well-paying job. Thus survival in our society is defined in terms of the knowledge and technical skills required to get a job. It takes a certain amount of intelligence to be able to master this knowledge and these skills. If characteristics inherited from our parents affect our intelligence, as is probably partially the case, is natural selection operating to increase intelligence in the American population? Or are our medical advances and technology allowing the less intelligent to survive, thus decreasing intelligence in the American population?

It seems that in the above case we can speak of a sort of "cultural selection." The following example would also be "cultural selection." Suppose having blue eyes were to become extremely popular. Men would want to marry women with blue eyes and women would want to marry blue-eyed men. More blue-eyed children would be born. The percentage of blue-eyed people in the population would increase. Thus the fashion (which is culturally based and is learned) would have resulted in a change in a physical characteristic--eye color--in the population.

EARLY MAN

4.
 - a. On the following page is a world map. Indicate on the map the known geographical spread of man during the various stages in his development. (See the article "Leading Up to Modern Man.") You may want to use different colors in marking the map.
 - b. Man probably originated in Africa, but today he is spread all over the globe. Why did he spread so widely?
 - c. How do you think he was able to spread into and adjust fairly readily to so many different environments?
 - d. When did man come to the New World and how did he get here?

EARLY MAN

Capsule History of Early Man

500,000 years ago, at the onset of the first glaciation, most of man's waking hours were spent searching for food. He ate fish, wild roots and vegetable plants, nuts, berries, and other fruit. He also ate whatever animals he could kill. At first he ate a lot of very small animals or animals which were too old or sick to elude him. Later he learned to follow animal migrations and to hunt in groups. With a whole group of hunters, animals could be surrounded or run off a cliff or into a corral and so more could be killed with less effort.

By 300,000 years ago man was living in natural shelters near the raw materials, food, and water that he needed. He had learned to make and control fire. This seems to us a small accomplishment as we turn a knob to heat our houses and cook our food. Have any of you started a fire by friction, though? It is not too easy, is it? With fire as his servant, man was able to move into colder regions that earlier had been "closed" to him. He built fire at the entrances of the caves in which he lived. He still lived in very small groups, but he had developed the hunt almost to an art, outsmarting and killing animals far more powerful, swifter, and fiercer than he. Of course, his ability to make tools from bones and stones and probably also sticks extended his powers far beyond those he naturally possessed, and little, weak man began to "conquer" part of his environment, namely the great herds of animals he hunted.

Perhaps 50,000 years ago the modern physical type of man appeared. The fossil evidence indicates that this ancestor of ours was making stone blade tools as well as axes of excellent craftsmanship that gave him a greater degree of skill in his hunting and gathering. As time passed, human population increased and men were able to adjust themselves to varying environments as diverse as the tropical jungle and the arctic tundra.

About 18,000 B.C., or perhaps as early as 30,000 B.C., groups of men following large herds of Ice Age animals crossed the Bering Straits and entered the New World. Later, other groups of men crossed over. Some men even crossed back from Alaska to Siberia.

In the New World, these migrant hunters followed their game across the central plain of Alaska and south-eastward along the eastern slopes of the Rocky Mountains. These areas were relatively free of ice. From here, they gradually spread south and, as the ice melted, all over North, Central, and South America, arriving at the tip of South America perhaps as early as 8000 years ago. Evidences of these hunters have been found. In a cave in the Sandia Mountains of New Mexico, for instance, some large spear points have been found associated with the bones of prehistoric horses, bison, camels, mastodons, and mammoths. These points may date from 25,000 years ago. Artifacts of these hunters have also been found in South America associated with bones of a large extinct sloth.

It is very difficult for us to imagine how these early people lived 20 or 30 thousand years ago, hunting, fishing, and collecting whatever they could find. This first portion of human history might be looked at in the following way. Let us imagine that a day of twenty-four hours represents the 2 million years of man's probable history. (Every 100,000 years equals one hour.) At about 11:30 p.m., a few members of the human family learned to grow part of their food as well as hunt for it. Even more remarkable is that on our time scale of 24 hours of human history, only 2 minutes have been buzzing with civilization and advanced technology.

ARCHAEOLOGY

Introduction and Teacher Background

SECTION III - ARCHAEOLOGY: FINDING OUT ABOUT BURIED CULTURES SELECTED ANNOTATED BIBLIOGRAPHY FOR TEACHERS

Atkinson, R. J. C. Field Archaeology (London: Methuen and Co., Ltd., 1953).

This would be an excellent practical handbook for an archaeologist. It is clearly written and is organized in four parts: (1) searching, (2) recording, (3) interpreting, and (4) publishing.

Briggs, Lyman J. and K. F. Weaver. "How Old Is It?" National Geographic, Vol. CXIV, No. 2, Aug. 1958, pp. 234-255.

In this article the radiocarbon technique of archaeological dating is explained by pictures and diagrams as well as by written statements. Other dating techniques are also described. Students as well as teachers would benefit from reading this article.

Brothwell, Don and Eric Higgs. Science in Archaeology (New York: Basic Books, Inc., 1963).

Science in Archaeology consists of a collection of articles dealing with such archaeological topics as dating of finds, environment, man, artifacts, and prospecting. The articles deal primarily with the interpretation of finds rather than with digging methods. The book is excellent technically and would be a good reference book, though many of the articles are difficult reading.

*Chapman, Carl H. and Eleanor F. Chapman. Indians and Archaeology of Missouri, Missouri Handbook No. 6. (Columbia: University of Missouri Press, 1964).

There are several chapters about Indians in general leading into a discussion of the prehistory of Missouri. At the end of the book are several chapters on archaeological methodology. This book, particularly the last three chapters, would be an excellent one for students to read. There are numerous excellent illustrations in the book. Parts of two chapters are included in the manual as student reading.

Childe, V. Gordon. Piecing Together the Past (London: Routledge and Kegan Paul, 1956).

Some of the why of archaeology as well as the how is included in this book. It is clearly written (not too technical). Much of the approach of the author is evolutionary in the sense that archaeology is what it has told about man.

Curtiss, Garniss H. "A Clock for the Ages: Potassium Argon," National Geographic, Vol. 120, No. 4, Oct. 1961, pp. 590-592.

In this article is an interesting and readable description of one of the newest methods of dating archaeological finds.

ARCHAEOLOGY

Introduction and Teacher Background

DeLaet, Sigfried J. Archaeology and its Problems (London: Phoenix House, Ltd., 1957).

Though the print in this book is small and the examples given are fairly Europe-specific, the book is clearly written and would be a good source of information on archaeological techniques. It is organized by topics and also contains a fairly good index.

Hammond, Philip C. Archaeological Techniques for Amateurs (Princeton: D. Van Nostrand Company, Inc., 1963).

This would be an excellent book for students as well as teachers to read. It is organized in terms of topics and describes the step-by-step process of archaeology. The sections on problems of excavation and products of excavation are especially good. An excellent bibliography and index are included.

Heizer, Robert F. The Archaeologist at Work (New York: Harper and Brothers, Publishers, 1959).

In the above book are reading selections chosen to illustrate various aspects of site recognition, excavation, and interpretation. Many of the selections are excellent and might be used with students to illustrate different aspects of archaeology.

Hole, Frank and Robert F. Heizer. An Introduction to Prehistoric Archaeology (New York: Holt, Rinehart, and Winston, Inc.), 1965.

This book is an excellent introduction to archaeology, presenting clearly and well how archaeologists try to reconstruct human history from the surviving artifacts. It also contains an extensive bibliography. If one book of all these books mentioned is to be purchased, purchase this one. It would provide excellent background for teachers and would also be a good source book for student reports.

*Kenyon, Kathleen. Beginning in Archaeology (New York: Frederick A. Praeger, 1961).

The reading level of this book could be called "mediumly difficult." It is an excellent technical introduction to archaeological archaeology, however.

Petrie, W. M. Flinders. Methods and Aims in Archaeology (London: Macmillan and Co., Ltd., 1904).

This is a how to do book which describes how to organize and carry out a "dig" in detail. It is clearly written and would be a good introduction to archaeological methodology (with, of course, the date of its publication borne in mind).

ARCHAEOLOGY

Introduction and Teacher Background

Piggott, Stuart. Approach to Archaeology (Cambridge, Mass.: Harvard University Press, 1959).

Though part of this book is fairly specific to Britain, other parts of it describe techniques of excavation and methods of interpretation which would be applicable to any archaeological situation. Chapter one, "The Discipline of Archaeology," contains an especially good description of what archaeology is.

Pyddoke, Edward, Ed. The Scientist and Archaeology (London: Phoenix House, 1963).

This book consists of a collection of articles dealing with such topics as soil, science, pollen analysis, radioactivity, study of metals, and chemical analysis and indicates how these topics may aid the archaeologist in interpreting his data. Like Science in Archaeology, it would be a good reference book, though most of it is fairly difficult reading.

Webster, Graham. Practical Archaeology (London: Adam and Charles Black, 1963).

In this book archaeological methods and techniques are explained with reference to Britain, but they are explained generally enough that this knowledge can be applied to other archaeological milieu. Some parts of the book are fairly technical, but the book is good. It is written clearly and contains excellent diagrams.

Wheeler, R. E. M. Archaeology from the Earth (Oxford, England: Clarendon Press, 1956).

Though the writing in this book is fairly technical, making for "mediumly difficult" reading, Archaeology from the Earth would be a good reference book for archaeological theory and methodology. It is conveniently organized by topics.

*Woolley, Sir Leonard. Digging up the Past (Baltimore: Penguin Books, 1963).

This book is written rather like a story. It contains good descriptions of archaeological field methods, though much of the field work described is specific to the Middle East.

ARCHAEOLOGY

Introduction and Teacher Background

INFORMATION PERTAINING TO SLIDES USED
WITH THE ARCHAEOLOGY SECTION

Slide NumberTitle

ELAINE BLUM ARCHAEOLOGY SERIES

351 (E. B. 1) Archaeological Sites in Illinois

There is good, detailed information about the archaeological sites marked in red. It can be seen that the majority of these sites in Illinois are located on rivers and streams. These rivers and streams were important to the Indians for transportation and communication as well as for sources of water.

352 (E. B. 2) Site on Sandy Ridge Near River

This site, near Rock Island, is located on a sandy ridge above the flood plain of the river. It shows up as a light, sandy section of an otherwise fertile field. The site was originally somewhat wooded and in a good location for fishing and for clam-hunting.

353 (E. B. 3) Digging and "Levels" on an Illinois Site

In digging a site, it is important that the levels be kept flat and the sides of the squares be kept straight so that accurate records of the placement of artifacts can be kept. In this picture can be seen the box used for sifting sand and the stakes used for measuring.

355 (E. B. 5) Archaeological Equipment - The Wheelbarrow and Sifter

At most archaeological "digs," there is a lot of overburden (dirt covering the layers of archaeological interest). Thus a wheelbarrow for moving this dirt is essential. Dirt and sand removed from the site are sifted so that every artifact may be recovered and taken back to the laboratory for analysis.

356 (E. B. 6) "Features" in the Soil

Orange colored "features," patches of lighter colored soil, stand out from the darker soil around them and indicate that there has been some kind of change, activity, or disturbance at that point.

357 (E. B. 7) Large Refuse Pit

This picture shows the profile of a refuse pit with lighter soil on top and dark, refuse-stained soil at the bottom. The presence of the pit explains the contrast at the top of the pit between light soil in the pit and dark soil outside the pit and at the bottom of the pit between dark soil in the pit and the lighter soil (in its original sterile condition) around it. Note the mason's trowel in the picture. An analogy could be drawn between these refuse pits and the practice of today's campers in the wild burying their garbage.

ARCHAEOLOGY

Introduction and Teacher Background

358 (E. B. 8) Differences in Soil Color, and Mussel Shells

Several changes in soil color can be seen along this trench. The whitish zone is a bed of mussel shells, probably the refuse from several dinners. There is a light area of sterile soil extending almost to the plow zone and a very dark top band of soil six to eight inches thick which is the plow zone, the area most recently and constantly disturbed by cultivation of the soil. Note the straightness and evenness of the sides of the trench. Note, also, the sifter and the stakes at the edge of the trench.

362 (E. B. 12) Archaic Stone Hand Axe

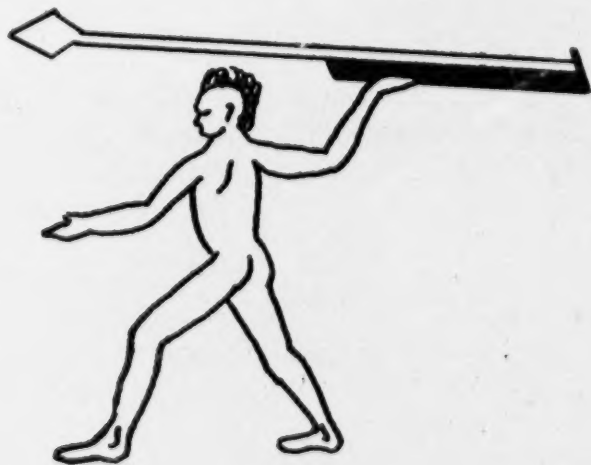
This axe was used for woodworking, indicating some specialization. The large Pleistocene fauna were gone and the Indians were hunting more small game, fish, and engaging in more specialized gathering.

363 (E. B. 13) Archaic Scrapers, Pendant, and Gorget

At this time chert tools (Chert is an impure flint-like rock which is usually dark in color.) and scrapers were used in greater quantity, showing that the Indians were working fibers or preparing meat and skins. They had some leisure time to make non-essentials, as shown by the pendant and fragmentary gorget shown in the upper lefthand corner of the slide. (A gorget is an ornament decorating or protecting the neck. Primitive gorgets were made of bone, stone, or shell. Later they were made of metal.)

364 (E. B. 14) Archaic Projectile Points and Atlatl Weights

The stemmed and notched projectile points are fairly large in size and are well-made but often not quite as well-made or as well-finished as those of the Paleo-Indian period. Some points are thinner and not notched. The atlatl weights pictures are made of fine-grained stone, often in the shape of a butterfly, and drilled through the center. The atlatl weight is then fitted on the end of the atlatl or spear-throwing shaft. (The atlatl or spear-thrower is a straight piece of wood with an inward pointed spur at the end. The spear used with it has a depression on the end to fit this spur. In making a cast, the spear-thrower throws his arm up and over, pushing the spear forward. The atlatl serves as an extension of the arm and approximately doubles the force and range of the spear thrown. The atlatl was invented and used before the bow and arrow.)



ARCHAEOLOGY

Introduction and Teacher Background

365 (E. B. 15) Archaic Fire Pit

This large pit was used for cooking and roasting food. At the bottom of the pit are several fire-cracked rocks. The soil in the pit is dark from charcoal.

366 (E. B. 16) Post Holes from Archaic Houses

In this slide is shown evidence of Archaic Houses. All of the superstructure of these houses has long since gone, but dark, circular spots may be seen in the ground being excavated. These spots show us the pattern of the sapling posts supporting the superstructure of the houses. Note, also, the stakes, even levels, and the mason's trowel.

367 (E. B. 17) Outline of an Archaic House

The line of small stakes shows the outlines of two Archaic houses, oval structures built on the top of a sandy ridge along the Rock River. There are no interior fire pits or storage pits in these houses, showing that they were simple shelters erected for a short period of time, as for a summer or part of a summer, while the Indians fished and gathered mussels.

370 (E. B. 20) Archaic Flint Workshop

It is important to look for things in situ, i. e., in the places they were left by the Indians. Two hammerstones and a collection of chips were found together here. It may be inferred that this spot was an Archaic stone workshop where an Indian was making flint tools.

372 (E. B. 22) Woodland Period Projectile Points and Bone Implements

There are changes in tool types at this time. The atlatl is still used as a hunting weapon, but the typical projectile points of chert are broad corner-notched ones markedly different in shape from the points of other periods. Note the fine flaking on the whitish points. There are also antler and bone projectile points made from hollowed, pointed pieces of bone which were put on the end of a wooden staff. Fishhooks of bone were made by cutting an oval from a long bone and then splitting it in two to make two fishhooks. Note that one of the fishhooks in the slide has not yet been split in half.

373 (E. B. 23) Woodland Period Pottery

Pottery was introduced in this period and the people were leading a more sedentary life. (A more sedentary life could mean the presence of agriculture and this is indeed the case here.) At first the pottery was simple, crude, and thick. The temper mixed in with the clay was coarse and grainy. The pots were decorated with a variety of complex textured designs made by rocking stamps, notched-edged shells, or bones moved back and forth.

Two common types of vessel forms at this time were the flat-bottomed one, the less popular form, and the pointed-bottomed one, the more popular form. The pointed bottomed pot was probably more popular because it could easily be set in the fire for cooking.

ARCHAEOLOGY

Introduction and Teacher Background

375 (E. B. 25) Out-of-State Materials Hopewellian Indians Traded For

The materials shown in this slide are commonly found in Hopewellian sites. The copper might have come from northern Wisconsin and Michigan, the shell from the Gulf of Mexico or the southern Atlantic coast, and the obsidian from Wyoming, New Mexico, or Mexico. Thus the Hopewellian Indians probably had trade relationships extending over a wide area.

376 (E. B. 26) Middle Woodland House Plan

The houses at this period were oval or rounded structures similar to but larger than the houses of the Archaic period. The posts of the house in the slide were wedged in place with stone. Several pots, broken by ploughing, are lying on the floor and there is a fire pit in the center. A dog was buried under the floor (which shows that the dog was probably important to the household or he would not have been buried there). All of these things in the house indicate that more living and cooking activity apparently took place in this house than in the earlier Archaic summer houses.

377 (E. B. 27) Woodland Grave Goods

Burial mounds were commonly made by digging a rectangular tomb below the ground surface and laying bodies in it. Grave goods were put in with more important individuals. Frequently logs were put along the sides of the tomb. The whole tomb was then covered with more logs, matting, or stone, with stones and dirt heaped over this.

Typical of grave offerings are these platform pipes, sometimes plain and sometimes carved. In the slide are shown one with a cylindrical bowl carved in the form of a bear and another carved to represent an owl. Also included in the grave goods were stone earspools, copper beads, stone gorgets like the reel-shaped white stone gorget shown, and drilled bear's teeth which were worn around the neck as necklaces.

379 (E. B. 29) Mississippian Agricultural Implements - Hoes

The presence of hoes at this time indicates that agriculture was being practiced. This fact would have implications for population size and groupings. Thus the Indians probably lived in fairly large communities supported by intensive corn agriculture. One of the hoes in the slide is made from the scapula or shoulder blade of a large animal, another is made from chert, and the third is made from a shell.

384 (E. B. 34) Mississippian Nonutilitarian Items

In this slide are shown a pipe (elbow style), bracelets, and anklets made of shells obtained from the Gulf of Mexico or the southern Atlantic coast, a string of river pearls which could have been obtained locally from the Illinois River valley, and a clay figurine, broken but well-modelled and well-styled. The presence of such items indicates that these people must have had some leisure time. The bracelets and anklets indicate the existence of a fairly wide-ranging trade network.

ARCHAEOLOGY

Introduction and Teacher Background

ELLEN JOHNSON ARCHAEOLOGY SERIES

401 (EKJ 1) New Mexico Archaeology - Trenches*

At the beginning of the dig, a series of trenches were dug. Note the tools used here and the survey stakes. The paper bags are for the things found, the bags being labelled and a different bag used for each level and area of the trench.

The dryness of the earth makes it difficult to keep the walls of the trench absolutely vertical. The hats were worn for protection from the hot sun.

402 (EKJ 2) San Gabriel - Excavation of the Church*

The rocky area at the back of the picture is the remains of the first Spanish church in the New Mexico area. Note the stones at the bases of some of the walls but not at the bases of others. When the Spanish came to this area, they moved into an Indian pueblo. They lived in some rooms Indians had built, but they also added on more rooms. The Spanish lined the bases of the walls they built with rocks before finishing the walls with adobe bricks. (The Indians had not lined the walls they built with stones.) Early Spanish records and Indian legends helped to locate this site in a present-day cornfield.

Note the adobe house of a present-day Pueblo Indian family in the background and the digging in process.

403 (EKJ 3) Preservation of a Pueblo Excavation*

Note how the walls of the pueblo are standing out since the rooms have been excavated. The site is being covered with dirt to preserve it so that weathering will not melt it down and destroy it.

ROHN ARCHAEOLOGY SERIES

The slides in this series point out some processes that take place in excavating a site. The site pictured here is the Flower Hill Site, a trash dump, located near Marshfield, Massachusetts. These slides were taken by Arthur H. Rohn, Archaeologist, University of Illinois.

826 Laying Out Grid

Work on the site is just beginning. The grid is being laid out. Note the stakes and strings.

827 Cutting Root Mat

Roots of grass and small plants have formed a matting in the top layer of soil. This mat is being cut so that it can be stripped off. Students may have seen rolls of sod, similar to this, which are to be laid on a yard in front of a new house.

*For further information about this site see the article "Conquistador's Capital," Time, Vol. 80, No. 5, Aug. 3, 1962, p. 32.

ARCHAEOLOGY

Introduction and Teacher Background

828 Removing Root Mat

The root mat is being removed.

829 Trowelling during Stripping

Great care must be taken that valuable data is not stripped off with the root mat.

830 Measuring Depth

The depth of a particular point is being measured.

831 Measuring Horizontal Position

The position of a point relative to the grid line is being measured.

832 Completed Field

Note how bags containing important artifacts and archaeological data are carefully labelled. The point in the site from which the data in this bag was taken is located in Square W-G15, Level 1B. This point is 22 centimeters deep and is 47 centimeters east and 36 centimeters west of the lines in the grid. The point was excavated by Arthur Piper on July 28, 1965.

833 Partially Excavated Site

When this picture was taken, part of the site had been excavated up to the marking stakes.

ARCHAEOLOGY

Introduction and Teacher Background

ADDITIONAL ACTIVITIES

There are a number of additional activities which may be engaged in conjunction with this unit. Some of these will be mentioned here and others will be mentioned later in the unit. There may be a museum or an archaeological excavation in your area to which you and your students could make a field trip. In almost every community there are persons who collect Indian artifacts as a hobby. Perhaps one or more of these persons could exhibit his collection and speak to the class. You may wish to ask a science or art teacher in your school to speak to your students about how their fields are related to archaeology and may assist in archaeological interpretation. There are films on excavation techniques listed in many different film catalogues, including those of the Illinois State Museum and the University of Illinois Audio-Visual Service. Pictures of archaeological excavations may be exhibited. There are pictures, for instance, with the article "The Shards of History," Time, Vol. 82, No. 24 (Dec. 13, 1963), pp. 50-60. Other pictures may be found in Life magazine or in the National Geographic magazine. In the Readers' Guide to Periodical Literature, you should be able to find listing of articles dealing with archaeological topics.

Another activity which your students might want to pursue, and which would be an excellent learning device if you have the space, would be to construct an archaeological site in a box. See a further description and explanation of this activity near the end of the section.

FILMS

Archaeologists at Work. University of Illinois. i-j-h, 13 min., 60469, color: \$4.85.

Is a good film for demonstrating many aspects of archaeological methodology from finding sites and setting up the excavation to the laboratory analysis. It must be remembered, however, that this dig is smaller than most and that usually artifacts are put into bags rather than laid out on colored strips of paper. The paper was for the benefit of the camera. This film would be better for archaeological methodology than Learning about the Past.

Note the loose use of the term "civilization" at the beginning of the film. We are defining it more carefully than this. By our definition, the film should have used ancient cultures instead of ancient civilizations.

Digging into History, Part 1 - Exploration. University of Illinois. h-c, 13 min., 50060, color: \$3.85.

Would be a good film to illustrate archaeological methodology. An expedition from the University of Illinois travels to the lower Illinois River and finds traces of an early Indian village. It uncovers a house forty feet in diameter and finds skeletons of a dog, a small child, and an old man.

Digging into History, Part 2 - An Early Illini. University of Illinois. h-c, 14 min., 50061, color: \$3.85.

An artist is shown using clay to sculpture surface features over a replica of an Indian skull found in the early Hopewell village discovered on the banks of the lower Illinois River which was explored in the preceding film.

The two films may be shown at the same time, in order, or the first one may be shown alone. They go well with the Middle Woodland period article in Illinois Archaeology.

ARCHAEOLOGY

Introduction and Teacher Background

A Glimpse of the Past. University of Illinois. (iu), i-j, 9 min., 01902, color: \$3.40.

Uses dioramas and archaeology to present information about aspects of pre-historic American Indian life. Reconstructions of a clay pot and a house are shown and how they were made is discussed. Shows Indian artifacts and, briefly, how they are cleaned, numbered, and catalogued. Parts of this film may seem childish for high-ability secondary school students, but there is some good information presented in the film.

Learning about the Past. University of Illinois. (iu), j-h-c, 10 min., 02139, color: \$3.40.

This film, made at the Angel Mound site in Indiana, shows many of the procedures involved in an archaeological dig. Pictured and discussed are the surveying, excavating, and laboratory work. The making of dioramas is also discussed briefly. (The film A Glimpse of the Past does a better job with dioramas.) The film speaks of how an archaeologist knows (We say he makes inferences.), and of relating one thing found to another. (We call this association.) For archaeological methodology, this film would be better than A Glimpse of the Past.

ARCHAEOLOGY

Introduction and Teacher Background

TEACHER BACKGROUND READING

Section 3 - Archaeology

At this point in the cultural development unit, it is important that students understand how information about early man and about cultures that existed in the past is obtained. They, also, need to understand why we have so relatively little data on these people and cultures and what kinds of data about them are obtainable. It is hoped that in the course of this section on archaeology, the students will learn to ask the kinds of questions about archaeological data and make the kinds of inferences from this data that archaeologists ask and make.

This section of the unit is organized around the following question: "How do we find out about cultures in the past?" Other, subsidiary questions and the most important concepts in the unit are as follows:

1. What data would there be to work with in describing cultures in the past?

a. What would be preserved over time?

historic/prehistoric archaeology - The archaeology of cultures about which there are no written records may be termed "prehistoric." This does not necessarily mean that writing must be a part of the inventory of all "historic" cultures.

artifact - An artifact is something material which has been made or used or strongly influenced by man.

site - A site is a place which has been influenced by human activity and at which artifacts may be found.

b. How can this data be found and brought forth?

survey - A survey is the means by which archaeologists locate and record the locations of sites.

excavation - Excavation is the process by which archaeologists bring the remains of cultures to light.

control - Control is the term used to describe the care with which the archaeologist records his data so that when the site is dug, he knows exactly where each artifact was located.

2. How can this data be described and interpreted so as to tell us something about past cultures?

context - Context is the term used to refer to the space - time - culture location of an artifact within a site. Thus an artifact may be described as being found in a particular context.

ARCHAEOLOGY

Introduction and Teacher Background

stratification - The term stratification refers to the situation that layers or strata may be found in a site. The presence of these strata enables the archaeologist to "place" an artifact in a time context.

association - This term refers to the situation that exists when certain artifacts are found together, associated, under circumstances suggesting they were influenced by man at the same time period. The term "association" may also refer to such a grouping of artifacts. The term assemblage is used to refer to a grouping of artifacts commonly found associated.

typology - A typology is a classification of archaeological data such as artifacts into convenient named categories. Typologies enable archaeologists to better describe and compare their data.

culture history - An archaeologist is interested in cultures, so when he describes the history of a site or of an area, he describes the culture(s) that existed there. This description may thus be termed a culture history.

The most important concept in the unit, of course, is archaeology. Archaeology is the reconstruction of man's past from its material remains. It is one way of approaching culture history. An archaeologist may actually work with three kinds of data: 1. artifactual data, 2. non-artifactual data (as bones, pollen, etc., which are not influenced by man), and 3. geographical or chronological data regarding positions of sites, etc.

Chronological data may refer to either relative dating or absolute dating of a site or of artifacts. Dating is relative when one site, part of a site, or artifact is older or less old than another. Dating is absolute when a site, part of a site, or artifact can be "placed" at a set point in time on some calendar. Some methods of dating absolutely are by using historical records, dendrochronology (age of wood determined by growth rings of trees), fluorine analysis (fossilized bones dated by the amount of fluorine absorbed over time), and carbon (carbon dated by amount of radioactivity).

Note the annotated reading list and descriptions of the slides to be used in the unit. If you are interested in obtaining a good introductory book on archaeology, We recommend the book An Introduction to Prehistoric Archaeology by Robert F. Heizer and Frank Hole.

ARCHAEOLOGY

RECOMMENDED TIME TO SPEND ON THIS SECTION: 10 school days.

1. Begin by asking this question: How do we know so much about early man? How did we get this information? Your students should know by this time about the archaeological work which has brought much information to light. You might want to review with them some of the archaeological methodology which was described in connection with the finds of Dr. Leakey.

35

It is primarily archaeology which has given us information about early cultures, too. You might ask your students what kinds of data historians primarily rely on for their descriptions of past cultures. They use mostly written records. The information about past cultures before writing, and also much information about past cultures after writing, comes from archaeology.

It might be wise at this point to ask the students what an archaeologist does so as to obtain a "bench mark" of the students' understanding of the field of archaeology.

The question of whether or not an archaeologist uses written records may be brought out. Discussion of this question could help clarify the difference between prehistoric archaeology (the archaeology of cultures about which there are no written records) and historic archaeology (archaeology which enjoys the benefit of written records about the culture being studied). Historic archaeology may serve to substantiate and add to or refute the written records. (Actually, the use of the terms "historic" and "prehistoric" is unclear in the archaeological literature. You might want to check the discussion on this in Hole and Heizer, An Introduction to Prehistoric Archaeology.)

One thing which an archaeologist does is to describe what he has found. Many times what he finds are tools used by the people in the society whose culture he is studying. In talking about the tools or other "pieces" of our material culture, you may wish to introduce the concept of "artifact" to your students. Be sure that they understand that the concept may be used broadly enough to refer to articles in the present as well as to articles from the past.

Artifacts

If they are available, you might want to show your students some artifacts from another culture and see how they would describe them or at this point some tools typical of our culture may be brought out. How would an archaeologist of the future describe these? What inferences might he make about our culture from analyzing these tools? Some tools which you might want to use could be: a knife or several kinds and sizes of knives, a screw driver, pliers, a hammer, several kinds and sizes of scissors; etc. Describing similarities and differences in and trying to classify several kinds of the same sort of tool could provide an introduction to the concept of typology which will be considered more fully later. Have your students list the criteria they used in putting tools into the different categories.

ARCHAEOLOGY

Make sure that your students' descriptions of the tools are clear and unmistakably refer to the tools described. If they were archaeologists who had just found these tools, they might not know what their uses were. Do your students' descriptions rely overmuch on "hypotheses" about uses of these tools?

Your students may want to write descriptions of tools themselves. These descriptions may be humorous or serious. You may want to read them some descriptions of this sort. In "Away Back in 1965" in Pierre Berton's book My War with the 20th Century (Garden City, New York: Doubleday and Company, Inc., 1965), and reprinted in an article called "Relics from the 20th Century" in the January 1966 Readers' Digest, are some humorous descriptions of twentieth century artifacts. Some of the artifacts described are a barbeque grill, a briefcase, and a parking meter. The parking meter is described in the following manner:

One Springfield student last year even described a garbage disposal as if he had just seen one:

"This is one of the most fantastic things I have ever seen. The people worship it three times a day and even sometimes late at night. They give it food and even sometimes they give it rings or spoons. It chews up the food with a whirring sound. Every so often they give it too much and a man must come to give it something for its indigestion."

There is a humorous description of a pay toilet in the story "Report on 'Grand Central Terminal'" in the book The Voice of the Dolphins by Leo Szilard (New York: Simon and Schuster, 1961, paperback). The book The Weans by Robert Nathan (New York: Alfred A. Knopf) is a description of the discovery of the remains of a civilization (ours) more than 5000 years hence. There is a great deal of subtle satire in the book, however, and it is not recommended for use with students.

These exercises b. and c. should help your students sharpen their descriptive skills. For b., students might challenge each others' descriptions until the clearest descriptions possible are obtained. Exercise c. can be a guessing game fun for teachers and students. The discussion of artifacts and how they might be analyzed and interpreted, or, perhaps, having students read to the class some of the descriptions they have written, could lead to a consideration of

ARCHAEOLOGY

how it is very difficult for archaeologists to know whether their descriptions of artifacts are adequate or their inferences regarding archaeological data (such as the uses of artifacts) are accurate. Why do your students think archaeologists might use the word "probably" a lot?

2. Ask your students what kinds of things would last over time. What kinds of information would an archaeologist have to go on? Have them look around the classroom or think of their homes and write down such items that they think would be likely to last over time. What are some things which an archaeologist, say, 2000 years hence might find as remnants of our culture? How would the artifacts named in lb. or e. last? 36

Now have your students list the materials of which these things are made. Some discussion and sharing of ideas among the students would be valuable here.

3. Ask the students to read the selection on the following page in their manuals and answer the questions following the selection. (You may want to discuss their answers to these questions in class.) 36
The following is an optional activity which has proved to be stimulating to the class in past years. You may not want to use this activity if you intend to spend some time excavating sites with your students.

Assign individual students or groups of students to give brief reports centering on what archaeologists can find out from some of the different materials which would last over time. For convenience in looking for information on these topics, we have included below some suggested topics for reports:

1. pollen analysis (polynology)
2. carbon-radio carbon dating
3. soil horizons and geology
4. animal bones and teeth (paleontology)
5. wood (tree ring dating - dendrochronology) and other usually perishable remains
6. metal
7. stone objects and projectile points
8. pottery
9. human bones and teeth

Encourage students to report on only what is most important about their topics. Set a time limit on the reports.

These reports may be given preceding the day on which the students "become archaeologists" and analyze archaeological data presented by slides.

See the following pages for suggestions about information which may be included in the reports. These suggestions by no means exhaust the possibilities.

The students may find information about these topics in assigned readings, books on archaeology, or encyclopedias.

ARCHAEOLOGY

SUGGESTIONS FOR STUDENT REPORTS ON WHAT ARCHAEOLOGISTS CAN FIND OUT FROM DIFFERENT MATERIALS UNEARTHED BY ARCHAEOLOGY

1. Pollen analysis (polynology). Pollen grains, practically indestructible, can be extracted from the soil and identified in the laboratory with a microscope. Studying these pollen grains can tell us about the kinds of plants in the area at that time period and about climatic changes. Changes in the percentages of different kinds of pollen caused by forest clearance can sometimes tell us whether agriculture was present.
2. Carbon--radiocarbon dating. Pieces of charcoal found in a site can be used to date that site on an absolute time scale. The carbon₁₄ method of dating is probably the best known method of archaeological dating.

This is how C₁₄ dating works. C₁₄ is constantly being formed in the upper atmosphere by the action of cosmic rays. Every plant and animal absorbs this as long as it is alive. C₁₄ disintegrates at a fixed rate. (Its half-life is 5,568 years.) Thus a site would have existed 2,784 years ago, plus or minus a certain error, if half the C₁₄ the carbon that would have been absorbed still remains.

C₁₄ dating is limited. It can act only on organic remains radioactivated by cosmic radiation (and such organic remains are not found in all sites); a relatively large quantity of these remains is necessary for analysis; and the practical limit for accuracy of this dating method is 25,000 years, plus or minus an error of 5%.

3. Soil horizons and geology. Variations in soil can show the presence of carbon, the remains of decayed animal or vegetable matter or a camp-fire. Traces of ochre in the soil can tell us about funerary customs (often ochre was buried on the dead).

Soil analysis can help date sites and can tell us some things about the environment at the time the soil was formed.

4. Animal bones and teeth (paleontology). These bones and teeth can be classified to tell us what animals live in the areas and which of these animals men ate. It can sometimes be told whether the animals were domesticated or wild. Bones that men cracked open to get at the marrow indicate methods of eating. Some large animals or herds animals can only be effectively hunted by groups of men. The presence of bones of these animals in a site would tell us something about the social organization of the people at this time and in this place. Analyses of animal bones can also tell us about diseases or injuries of the animals, how they were killed, their age when slaughtered, the parts of the animal eaten, and the percentage of male and female animals eaten. Sometimes the time of year the camp was occupied can be told by the seasonal condition of the carcasses (as whether the deer have horns).

ARCHAEOLOGY

5. Wood and other usually perishable remains. The presence of remains of this sort indicates something about the climate, perhaps that it is dry. These remains usually tell many things about the culture--as, for instance, what goods the people ate, how they made their garments, if they made baskets, etc. Sometimes even bodies of the people themselves are preserved. Large beams in the pueblos in the U. S. Southwest have been used for dating by the method of dendrochronology. The growth rings in these beams have been correlated to provide a time scale for the last 3,250 years. Wider rings indicate more rainfall or a different distribution of rainfall throughout the year than the narrower rings. This chronology was a relative one until beams of known age were found to make it an absolute chronology.
6. Metal. Not all metal lasts due to rusting (as iron), but the presence of metal objects indicates either the presence of metalworking or the existence of trade relationships. Inferences may be made regarding technology of a culture from a study of the metal working techniques of that culture. How much groups are dependent on the objects of another culture may be inferred. Some metal objects can even be traced to their makers.
7. Stone objects and projectile points. The stone objects found can tell us a lot about the technology of the people who made them. Finely made articles may have been made by specialists, indicating some division of labor. Where the stone came from can tell us about trade or travels. What the stone object was used for can tell us about some aspects of culture (as the presence of an axe indicates the existence of wood-working techniques).

Rock engravings and paintings can tell us about conceptions of art, or, sometimes, perhaps, of religion. If they are relatively realistic, they can tell us about other aspects of the culture.

Analyses of projectile points can tell us where the stone or flint came from, how the points were made (level of specialization; technology), what kinds of animals the points were used to kill (large versus small points), and what kinds of shafts were used with the points (spear, arrow, etc.). This gives us clues as to what people ate, whether they hunted individually or usually in larger groups, etc.

The different styles of arrowpoints are used for dating purposes and for placing sites within larger cultural complexes.

8. Pottery. A people who had pottery had a certain degree of sedentariness in their life. The fineness and decoration of the pottery can tell us a lot about the art of the people and their level of technology, whether they had the potter's wheel or not, what they knew of firing methods, etc. Where the temper and clay for the pots came from can tell us about how far the people ranged or traded for what they needed. A sudden change in pottery type may indicate the presence of immigrants or invaders.

Different types of pottery were characteristic of different periods of time, so pottery is used for dating and crossdating sites.

ARCHAEOLOGY

9. Human bones and teeth. Analyses of human bones and teeth can tell us a lot about nutrition, diseases suffered, how people died (sometimes), their life expectancies.

Finding large groups of bodies buried together may indicate some aspects of social organization or the occurrence of epidemics.

4. Do not spend a great deal of time on this. If you are pressed for time, you may omit this activity.

Ask the students how archaeological sites may be found--where one would look for them. Several ways of finding these sites may be brought out by the students. Write their ideas on the board and then discuss them. Have the students take notes in their manuals.

The following lettered paragraphs, (which, by the way, are not written in any particular order), describe different ways of finding sites and some procedures which may be followed in class in discussing them. You may not wish to bring out all of these ways. In any case, build on the ideas which your students have brought out. And don't spend a great deal of time on this.

- A. Some sites are found by educated guesses. Finding a site in Illinois by this method involves learning to "think like an Indian." If I were an Indian where would I want to live? What things would I need and where would I need to go for them? The line of reasoning might follow such questions as these:

What are man's basic needs? Among other things, men need food, including water, and shelter. (You may want to check back to the culture section.) What would a place fulfilling these needs be like? Such a place would probably be located near water, food, some provisions for shelter, perhaps in a place easily defended, etc. Many sites were located in caves or on river banks. It would be appropriate to show slide 351 (E. B. 1) Archaeological Sites in Illinois here.

Could there be different types of sites according to man's different activities? Here it might be worthwhile to consider some of our different activities and the different kinds of sites which would be left from our culture, such as churches, schools, picnic grounds, offices, houses, parking lots, trash dumps, etc. Would archaeologists of the future know what these various places were used for if they didn't have books describing them? How would they know?

After this way of finding sites has been brought out, (and it is probably one of the first ways the students will think of), have the students read the selection from "The Archaeological Survey of Missouri" and answer, perhaps as homework, the questions in their manual following the selection.

ARCHAEOLOGY

- B. Surface features may indicate the presence of a site. Some obvious surface features would be mounds or buildings. Changes in color from surrounding areas indicate the presence of a site in slide 352. Other less obvious surface features would include bits of pottery or arrowheads lying around on the ground, some of which might have been turned up by erosion; hollows; small mounds; remains of walls; etc.
- C. Historical records and folklore indicate the whereabouts of some sites. For instance, San Gabriel, the Spanish capital in the New World before Sante Fe, was found by studying the written records of Juan de Onate, the leader of the colonizing group of Spanish and Mexicans, and by analyzing the Indian legends about the existence of an earlier pueblo on the bank of the Rio Grande. (See the article "Conquistador's Capital," Time, Vol. 80, No. 5, Aug. 3, 1962, p. 32.) The question "How would finding out about a site of a pioneer town be different from finding out about a site of an Indian village occupied from 600 to 800 A.D.?" may be asked here. (This question might bring forth the difference between historic and prehistoric archaeology.)
- D. Aerial photography shows up many sites. Viewed from above, patterns of ridges, hollows, or shadows not apparent to a ground observer may become more obvious, just as we can make out patterns in a rug that an ant could not see because he is too close to it.

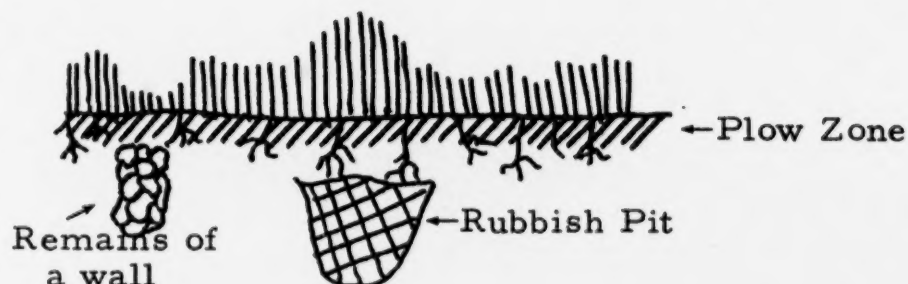
Slide 352 (E. B. 2) Site on Sandy Ridge Near River may be shown here. The class could be told that there is a site in the picture and asked to point out where it is. Then they may be asked how they knew this was an archaeological site. This discussion may lead to another method of finding a site--by soil qualities and by how well crops grow.

- E. Qualities of the soil or the way crops grow may indicate the presence of an archaeological site. Crops will grow better where the soil is looser (as where there has been a post hole) or where there are more nutrients in the soil (as where there is decaying matter, the remains of human habitation). They will grow more poorly, be smaller, and brown more quickly where there are walls buried beneath the ground.

A diagram of crops growing in a field may be drawn on the board. The top part of the diagram below may be used, for instance. Then such questions as the following may be asked: What do plants need to grow? (water, nutrients, etc.) Why are some of the plants in this diagram growing to different heights? (Some plants aren't getting these things they need and other plants are getting them and getting them in quantity.) The question "Why might this be?" may lead to a consideration of what may be under the surface of the ground.

ARCHAEOLOGY

E (continued)



F. Electronic devices as the electro-magnetic detector may be used to indicate the presence of sites. Electric current is passed through the earth between two electrodes and the resistance is measured on a meter. When clay is baked hard, as in pottery, the iron particles in the clay become more magnetic. This magnetism can be measured by the meter.

G. And sites may be discovered by accident. Actually, most sites are probably found in this way.

5. Have the students read the article "The Archaeological Survey of Missouri" in their manuals and answer the questions at the end of the article. In discussing question 4A. with your students, be sure that they state the criteria they are using to choose spots to look for possible sites.

6. Since how sites may be found has been discussed, the question of how archaeological data can be found has been partially answered. Thus it is time to deal with how archaeological data can be brought forth (excavation).

The following "question" approach with some suggestions for answers is included here as a possible organizing framework for class discussion on this topic. (The questions which may be asked are set off by quotation marks.)

"Assume now that we have found a site and are interested in excavating it. What do we do next?" The responses here may include such answers as: We get permission to dig, read about nearby sites, write the Archaeological Survey in Illinois, pick up and describe objects found on the surface, locate the site geographically, describe the site, etc.

In reading "The Archaeological Survey of Missouri" from Indians and Archaeology of Missouri the importance of describing the site is discussed. So now the question of how this is to be done may be asked. Ask your students for suggestions. Then project Slide 826 on the screen and ask your students what they think is being done. This procedure would help to describe what is found within the site. Artifacts, etc., can be described in terms of their locations in particular sections in the grid.

ARCHAEOLOGY

"Once you start to dig, is a grid diagram adequate to describe the exact location of an artifact? Why or why not? If it isn't, how may this problem be solved?" Once digging has begun another dimension has been added to the site--a vertical dimension. Sites are generally not perfectly level, and "ground level" measurements may not be accurate, especially since the excavator will be removing the ground he would be measuring from. Thus a datum line is used. A level string is stretched between stakes set at intervals. Measurements are made down from this string. Thus we now have, really, a kind of three-dimensional grid. Show Slides 830 and 831.

"When you have found a site and set up your grid, what do you do next?" Show slides 827, 828, and 829. Some sites may not have sod like this growing over them, but, where conditions are right for the growth of sod, the archaeologist has to strip it off.

Slides 353, 355, 832, 833, 401, 402, and 403 may be shown to illustrate the process of excavation. Slides 356, 357, and 358 may also be used here.

Slides

"Why are the edges of the excavation kept straight?" This enables us to see vertical relationships. It also helps to keep artifacts from slipping off the sides and falling down where we are digging without our knowing it." Why aren't the edges of the excavation as straight in slide 401 as they are in slide 353?" The climate has something to do with this. The soil is dryer and more crumbly in New Mexico than in Illinois.

Also, "Features" in the soil are usually seen more readily when the edges are kept straight. Slides 356, 357, and 358 show some "features" in the soil. These "features" in the soil, variations in soil color and content, may indicate that there has been some disturbance in the soil. There are "features" in the soil indicating the former existence of house posts in the slides the students will be analyzing and interpreting, so it is important that they understand what the existence of features in the soil may mean. These slides may be used by group 3 (Soil), too. You may want to ask your students to do some interpreting to see if they can figure out what is indicated by these particular "features" in the soil.

Point out the use of the tools and the stakes and strings in the slides. "Do digging methods differ depending on what part of a site you are working on?" A pick and shovel may sometimes be used to remove "overburden," the dirt covering the parts of the site in which you are interested. For finer digging a mason's pointing trowel is used. For the finest digging of all, as when fragile bones or artifacts are being excavated, a dental picture may be used to dig and a small paint-brush used to brush away the dirt. These fragile objects, after being excavated, are put in cotton and handled with special care.

ARCHAEOLOGY

"What are the paper bags for?" These bags contain the artifacts man-made or man-worked objects, bones, etc., which are dug up. There would be a different bag for each section and level of a grid. "What is done with the artifacts in the bags?" They are taken to the laboratory where they are washed and classified.

Your students may note that in the New Mexico slides, the digging does not always follow a grid pattern. Some archaeologists feel that trenching is an effective method for "sampling" a large area. Also, sometimes the patterns of the site, such as the rooms in the pueblo, "override" digging by squares in a grid. Thus the pueblo was excavated by rooms.

"What would happen to the excavated site over time, as, for instance, in the case of the New Mexico site?" Weathering would wash the site down and destroy it. "How may the site be protected?" Tarpaulins and plastic may be thrown over a site to protect it from rain. The best way to protect a site over a long period of time, however, is to cover it back up with dirt. This process of preservation is shown in slide 403.

There are some different kinds of excavating pictured in the slides. One kind involves taking out everything in the area you are excavating, thereby destroying that site or part of the site, as at the Illinois and Massachusetts sites pictured. (You might tell your students that archaeologists often leave part of their sites unexcavated so that other archaeologists with different points of view or future archaeologists with better methods can gain additional information from the site. In the other kind of excavating, certain features of the site are left for people to see, as the walls of the pueblo. The site is not entirely destroyed.

Ask your students to read the article "The Archaeologist at Work" and answer the questions about it. Discuss with them what is meant by the term "control". What are "control units"? Be sure that they understand the importance of control in archaeology.

- 56 8. The students may give their reports at this time. Be sure that their reports are concise and to the point. Let the students giving the reports "field" the questions of their classmates.
- 56 9. Part of the purpose of this unit has been to give the students the conceptual tools they need to think like archaeologists and to ask the kinds of questions of archaeological data that archaeologists would ask. Now is the time when they can try out their skills.

Slides After the reports have been given and before the students "become archaeologists," it might be a good idea to show several slides, such as 379 (E. B. 29) Mississippian Agricultural Implements--Hoes and 384 (E. B. 34) Mississippian Nonutilitarian Items, and help the

ARCHAEOLOGY

students to analyze these artifacts and make inferences about the culture represented. (Consult the slide descriptions for ideas about possible hypotheses.) This should be good practice for the students before they interpret slides on their own.

During this lesson and the ones which immediately follow, check the inferences which your students make. Can these inferences really be made from the data or are they way off base? Are the students inferring far beyond their data? You might have your students challenge each others' inferences so that students must show how the data supports the inferences which they have made.

10. Show Slides 362, 363, 364, 365, 366, 367, and 370 (The Archaic period in Illinois prehistory) to the class. (The space after each slide number and title is for your notes about the slide regarding its effectiveness and what your class gleaned from what they saw.) The Archaic period lasted from about 8000-1000 B. C.

57

Slides

Slide 1. Archaic Stone Hand Axe. No. 362 (E. B. 12)

Slide 2. Archaic Scrapers, Pendant, and Gorget. No. 363 (E. B. 13)

Slide 3. Archaic Projectile Points and Atlatl Weights. No. 364 (E. B. 14)

Slide 4. Archaic Fire Pit. No. 365 (E. B. 15)

Slide 5. Post Holes from Archaic Houses. No. 366 (E. B. 16)

Slide 6. Outline of an Archaic House. No. 367 (E. B. 17)

Slide 7. Archaic Flint Workshop. No. 370 (E. B. 20)

Keep your comments and clues to a minimum, giving the students just enough information that they can hypothesize on their own. These slides show the data which the students will use. There are spaces in the manuals for the students to take notes about them. Then they may write descriptions of what the culture of the Indians during the Archaic period in Illinois prehistory was probably like. Focus the students' attention on the kinds of inferences about cultures which can be made from archaeological data.

ARCHAEOLOGY

The students may view the slides and take their notes on them either individually or in groups. One advantage of viewing them in groups is that students can exchange their ideas about the slides. After the slides have been shown, then the students can either individually or in groups write the descriptions of the culture. Then different descriptions may be compared and discussed by the whole class.

Note that these slides (from the Archaic and Woodland periods) illustrate a hunting and gathering way of life changing to an agricultural way of life. Thus the data here may serve to somewhat "bridge the gap" between the Early Man and The Food Producing Revolution sections.

The following description of Indian culture at this period in Illinois prehistory was taken from the slides and may serve as a guide to the kinds of inferences which may be drawn from this data. (This description gives only some, not all of the inferences which may be drawn from the data.)

In the Archaic period, the Indians knew woodworking (hand axe). They hunted with atlatls. They cleaned and used the skins of animals possibly as clothing. Their houses were made of wood and other perishable materials and were erected as fairly temporary shelters (since there is no evidence in the houses of long-term living). They cooked in fire pits. There was some free time to make ornaments. These Indians probably moved around a lot. They don't have pottery yet. Without pottery, they must have roasted food and/or done their cooking in skins of animals or other perishable materials.*

58

11. Show Slides 372, 373, 375, and 376 to the students. Ask the students to take note of question 12a at this time. (Assign 12b as homework.) (By culture history is meant a general description of events and changes occurring in the culture in a particular region at a particular point in time. One student wrote: "Agriculture history is a sort of theory or hypothesis." It is important that, as a result of this exercise, the students see archaeology as furnishing time depth and certain kinds of data to understanding history of a region.) The Woodland period is usually divided into 3 parts, Early (2500 BC-500 BC), Middle (300 BC-500 AD), and Late (700 AD-1300 AD).

Slides

Slide 1. Woodland Period Projectile Points and Bone Implements.
No. 372 (E. B. 22)

Slide 2. Woodland Period Pottery. No. 373 (E. B. 23)

*For more information about these Indians, see Illinois Archaeology, Bulletin 1, Illinois Archaeological Survey, 1961.

ARCHAEOLOGY

Slide 3. Out-of-State Materials Hopewellian Indians Traded for.
No. 375 (E.B. 25)

Slide 4. Middle Woodland House Plan. No. 376 (E.B. 26)

Slide 5. Woodland Grave Goods. No. 377 (E.B. 27)

After the slides have been shown and the students have answered 12a and b, ask the students what observations they have made regarding Illinois Indian culture in the Woodland period. Then ask what cultural changes have occurred between the Archaic and Woodland periods. Group work is especially effective here. Focus the students' attention on the kinds of hypotheses about the cultural change which may be made from archaeological data. It is important that they see these changes as part of a gradual developmental process. Beware, though of such too vague comments as "they became more advanced or more 'civilized (?)'."

Some possible changes noted might be: There was a change in shape and flaking of projectile points. Pottery came into use. Some cooking may have been done in pots. The people appear to have been trading over a wider area. The houses were larger and the house posts were wedged in place with stone. More living activity probably took place in the houses.

After these changes have been discussed and perhaps several of the culture histories have been read aloud to the rest of the class, the students may check their inferences from the slides with readings in Illinois Archaeology, Bulletin 1, Illinois Archaeological Survey. (The Woodland slides used here belong primarily to the Middle Woodland period.) Ask the students whether they think these changes occurred rapidly or slowly. Why do they think this? (These questions should reinforce some of the generalizations about culture change which were made earlier in the culture section of the unit.)

12. Have your students check the inferences they made regarding the Indians of Illinois during the Archaic and Woodland periods. Illinois Archaeology would be the best book to use for this. Indians and Archaeology of Missouri may be used, also. Were their inferences (as brought out in the "cultural reconstruction" and the "culture history") accurate or not? If not, wherein did the students "miss the boat"? Why did they err? Have them correct their statements.

ARCHAEOLOGY

13. To evaluate what your students have learned in this unit, either have them write brief essays (about 250 words) on the following questions: What does an archaeologist do? What can he tell us about culture? and How does he get his information? or have them build and excavate small sites.

- (1) The essays have proved to be a very successful activity. The following are some quotes from last year's essays which illustrate student understanding of the content of the unit:

from Roxana

Student 1: "After they [archaeologists] have recorded the data, they make theories concerning the relationships of the information found to previous knowledge about natural environment throughout the ages and also previously known facts about other excavations."

* * * * *

Student 2: "After assimilating all the data he has recorded. . . the archaeologist proposes a cultural history based on the information he has obtained and collected.

"Last but not least, the conclusion he comes up with must be revealed to the public or the excavation would only be worthwhile and helpful to those who were directly involved in it."

* * * * *

Student 3: "[The description of artifacts is very important] because if an archaeologist does not take notes about his artifacts, when he gets back to the laboratory, all he will have is a pile of old "junk" because he could not remember where, how, and under what conditions he found the artifacts."

from Aurora

Student 1: "An archaeologist is almost like a detective. He is very careful and treats all the artifacts he finds as clues. Clues they are, indeed, and very important in the archaeologist's work."

* * * * *

Student 2: "An archaeologist is a combination of things. He is really several professional people in one, all linked into one occupation. Mainly, he is an explorer of man's past. . . . Finally, he is a teacher, as archaeologists are all expected to leave their findings as reference for other individuals or groups."

from Springfield

Student 1: "An archaeologist studies past cultures. Although the popular idea of an archaeologist is one of a rather unkempt man digging for old arrowheads, the most valuable parts of an archaeologist's job are performed after the digging is finished--the interpretation of the discovered evidence."

* * * * *

ARCHAEOLOGY

Student 2: "Archaeologists are the historians of unwritten times. They look for information that cannot be found by asking people questions.

". . . An inference is a guess based on the objects he has collected. Sometimes the inference is a sure thing. A small piece of metal that could not come from the immediate area would indicate trade. An inference that a certain kind of people had pets would be a poor one if the only thing found was a wolf skeleton thirty feet away from the house.

"The archaeologists' statements are influenced by what he knows and what he thinks. They can also be influenced by what his colleagues think. Since archaeologists are human, many of their statements have their own little thoughts in them. But, if inferences were not made, we would know very little about past cultures.

"The ambition of the archaeologist is to find out as much as he can about a culture through inferences made about material remains of a culture. First the archaeologist must know where to look. He would look in most likely places for men to live, usually near water. Next, he must have a knowledge of the correct methods for excavating and preserving a site and its artifacts. In order to make inferences about cultures, he must know the nature of the artifacts he finds. This requires a working knowledge of carbon dating, spectrography, and pollenology, to name a few of the fields.

"An archaeologist learns the tricks of the trade through experience, and knowledge of other cases and cultures. He learns to make inferences through comparison with other cultures. . . . The archaeologist can gain evidence by which he can make inferences from things which are not evident to the untrained individual. It is common place for an archaeologist to locate the position of a long-gone house just from looking at the soil. It usually takes a bit of education and logic, though, to glean data from artifacts. Associated artifacts are probably the best example. By itself, any one of a group of associated artifacts could be insignificant, but together they could explain many things about the nature of a culture."

* * * * *

You may want to discuss some of the essays or read some of them aloud to the class. At this time it might be fun to ask what kinds of knowledge an archaeologist needs to know. There should be a variety of answers.

- (2) The following explanation may help you to organize and plan the activity of building and excavating small sites. It is recommended that you pursue this activity rather than the essay if it is at all possible.

So that your students may better understand how archaeologists excavate, interpret, and describe, you should have your students build miniature archaeological sites in small boxes. Two students may work together to construct a site and two other students may

ARCHAEOLOGY

excavate the site. Each pair of students should write a culture history of the site, create a typology of artifacts found, and draw maps or diagrams showing the placement of artifacts. Then the two pairs of students can get together and compare their data. What are the similarities between what the site-builders intended and the excavators found? What are the differences? Why might these differences exist? The four students, together, should formulate a statement explaining the discrepancies between their accounts. The comparisons of what went into with what was taken out of the site should serve to illustrate some problems of archaeological interpretation.

Before your students start building sites, ask them what kinds of things they will need to know to build them. The following are some suggestions:

1. They will need to decide how many strata they will need to have. (It is recommended that they have no fewer than two and no more than five strata.)
2. They need to decide which strata will be occupied or whether they want to have any unoccupied strata.
3. They need to decide, generally the nature and histories of each stratum. Are all the strata occupied or are there to be unoccupied ones? What are the unoccupied ones to be like? The students may want to use different kinds of soils for the different strata.
4. For each occupied stratum, the students will need to decide what the culture of the people who "lived" there was like and what kinds of traces from these people and their culture might remain. The books Illinois Archaeology and Indians and Archaeology of Missouri might give your students some ideas regarding cultures. They may find other books to use or they may want to "make up" their cultures, too.
5. Then artifacts may be constructed and placed in the site. Perhaps some students could use the Art Room facilities to make several kinds of tiny pots or potsherds. Other students might want to try to make different kinds of projectile points.
6. A list of what will be used to represent what should be drawn up. For instance, if students use toothpicks or small stones to represent human or animal bones, then this should be stated.

Do not give your students directions for excavating the sites or analyzing, interpreting, and describing their data. They should already know how to do this and the work they do with these miniature sites may be used to evaluate their comprehension of what they have learned in the unit.

ARCHAEOLOGY

Two students here at University High School built and excavated a site and compared their data. They then entered this project in the State Science Fair. They concluded that:

"We conclude on the basis of the information that we gathered:

1. The archaeologist is 90% reliable but he can come to the wrong conclusions due mainly to the natural forces which are great factors in changing the site between the building and the excavation.
2. Since he has had no contact with the cultures involved, he has to be prepared to work with ever-changing hypotheses."

What do your students conclude?

Send to SSCSC the three best sets (builders' papers, excavators' papers, and comparison) of papers and your evaluation of this activity. Was the activity successful in strengthening your students' understanding of important concepts in the unit? Did they enjoy it? Do you have any suggestions for future site-builders or future site-builders' teachers?

15. MAKE SURE THAT YOU HAVE FILLED IN ALL THE INFORMATION AND COLLECTED ALL THE DATA REQUESTED. THEN SEND THE DATA TO SSCSC.

ARCHAEOLOGY

1. a. What does an archaeologist do?
- b. How might an archaeologist describe the following tools?
 - a.
 - b.
 - c.
 - d.
 - e.
 - f.
- c. Group these tools into categories below. List the criteria you used in placing tools into the categories.
- d. Describe several artifacts of our culture (other than those in 1b) as an archaeologist of the future might describe them.

ARCHAEOLOGY

2. a. Looking around you or thinking about your homes, what are some things that you think might last pretty well over long periods of time--say 2000 years?

_____	_____
_____	_____
_____	_____
_____	_____

- b. Of what materials are these things made?

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

3. Read the following selection in your manual and then answer the questions following it.

What is available for the archaeologist to study is only what has survived from the natural processes of destruction and decay over time. The material things of the past which survive are those which are accidentally durable such as stone, metal (though some metals, as iron, may rust away), pottery, and other substances. Pollen from various plants is practically indestructible. Plastic and glass also last extremely well. Bones are somewhat more resistant than flesh, which rots quickly. Rope, wood, cloth, leather, skins, furs, and food-stuffs are only preserved where they have remained quite dry, as in Egypt or Arizona, under water out of the reach of bacteria, as in Northern European peat bogs or lake beds, or in very cold areas, as in the case of the Pazyryk burials in the Altai mountains of Russia. The worst environments for preservation are those that alternate between hot and cold or wet and dry.

Special conditions, as when bones are fossilized, they decay and are replaced by lime, or when carbonization occurs (when organic things are burned, then chemical composition changes and they last longer), may also help to preserve various materials.

Sometimes indirect archaeological evidence can be used to infer the existence of vanished objects and techniques. The reconstruction of timber buildings from

ARCHAEOLOGY

the placement and proportions of the holes dug in the soil for uprights is an example of this. Impressions of cereal grains in clay pottery or in the plastering of hearths and houses can tell us a lot about the cereal crops gathered or grown by prehistoric men. Because much of the evidence about the past is so sketchy, complex techniques have been developed by archaeologists and other scientists to make the most of the evidence which is found.

So, owing to the survival of some things and not of others, we may have a very one-sided picture of the life of past societies. Flint and stone implements tell us something of the technology of early man, but we can only guess at the uses of some of the tools. We know that objects of wood, skins, and plant fibers must have been used by these people, judging from the material culture of "primitive" people that we know about today, such as the Eskimos, but these objects have not survived.

- a. Have you discovered any other materials which would last well over time? If so, add these to your list on page 2.
- b. Do habits or customs of people show up directly in the archaeological record? Why or why not? How do we learn about these habits or customs?
- c. Does climate make any difference in what materials last and how well they last? (Give reasons for your answer.)

4. What are some ways in which archaeological sites are found?

5. Read the following article partly taken from "The Archaeological Survey of Missouri" in the book *Indians and Archaeology of Missouri*. You may want to look at some of the pictures in the book itself. Then answer the questions at the end of the article.

ARCHAEOLOGY

(If a site location is made or artifacts are found in Illinois, you may report this information to the Illinois Archaeological Survey:

Mr. Charles Bareis
Illinois Archaeological Survey
137 Davenport Hall
University of Illinois
Urbana, Illinois.)

Answer the following questions:

- a. If you were looking for a previously undiscovered early Indian site in or near your community, where would you look? And what would you look for? Why would you look here or look for these things?
- b. What is an archaeological survey?
- c. Why might there be problems in marking the boundaries of a campsite?
- d. Why are site locations and the artifacts found on these sites important?

ARCHAEOLOGY

Your teacher will show some slides. You will want to take notes on these slides.

6. Read the following selection "The Archaeologist at Work" from Indians and Archaeology of Missouri and answer the questions about the reading. Note, too, the diagram of the Gamble site.

a. Why is it important to take careful notes when excavating a site?

b. List below tools and equipment of the archaeologist.

c. What is the purpose of a datum line?

ARCHAEOLOGY

d. What are some things we can find out about houses by excavation?

e. How does one carefully excavate a burial?

ARCHAEOLOGY

7. a. If you were excavating an archaeological site, where would you expect to find the oldest artifacts? Why?
- b. If you found two artifacts side-by-side in the same level of a site, what might you assume about these artifacts?
- c. If you found three different kinds of projectile points, how would you distinguish among them?

ARCHAEOLOGY

Stratification

If you were to empty a wastebasket, you would find that the junk on the bottom of the wastebasket was thrown into the basket earlier than the junk near the top of the basket. It is the same way with archaeological sites. Archaeologists find the remains of everything that would last through time in a number of different layers. The assemblage of things in the bottom layer was laid down earlier than the assemblage in the next layer up and so on up to the topmost, latest, layer.

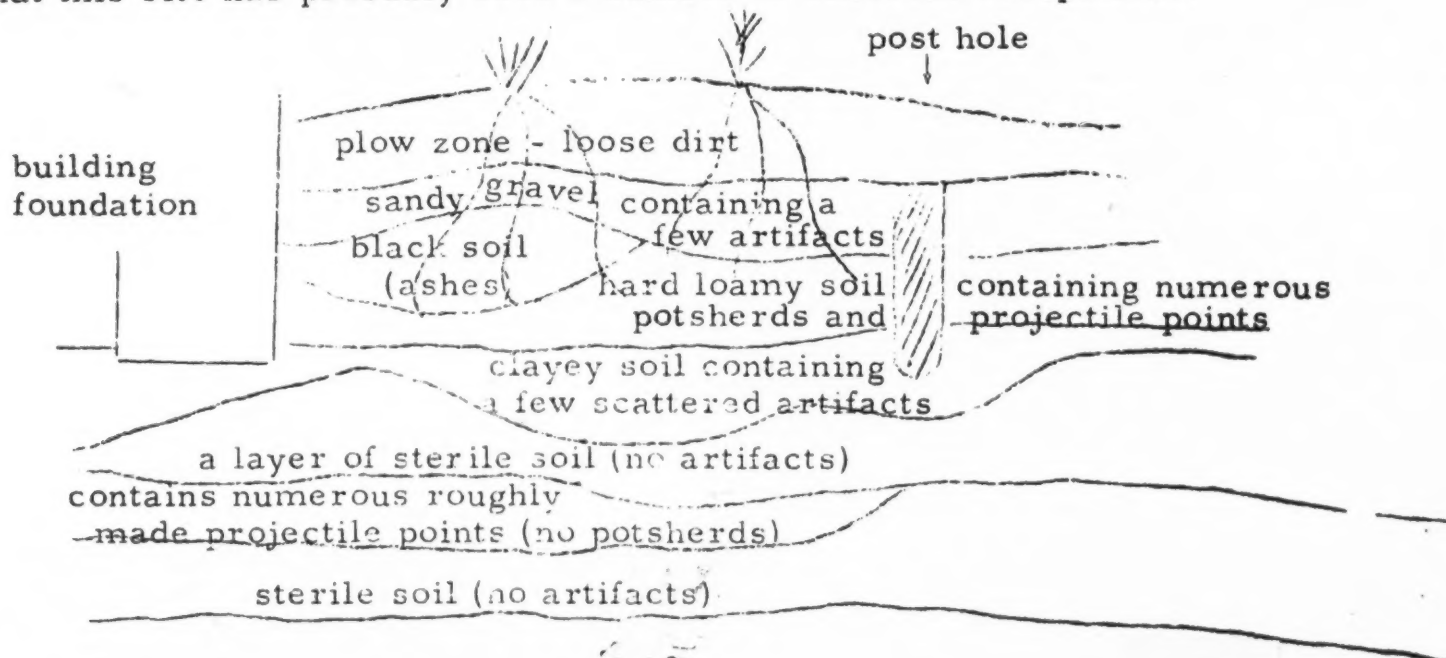
This phenomenon is called stratification. We thus say that a site is stratified.

How do these layers accumulate? The stratification, or total picture of the layers, of a site may result from a number of causes, both human and natural. The human would include the accumulation over time of the rubbish of daily living. Perhaps there were a number of successive settlements on this site. The natural would include the flooding of a river, which would leave depositions of silt; the action of worms; the growth and decay of plants on the surface; etc. Various things may intrude into these layers, too, making the total stratification picture anything but neatly delineated. Tree roots, animal burrows, building foundations, post holes, and burials may intrude into different "levels," which may be anything but level.

Stratification can tell us a lot about relative dating both within and between sites. The different layers in a site are its strata. Strata may be set off from each other because 1) they look or feel different (soil content, color, texture; such as gravel as opposed to clay); 2) one layer is "sealed off" from another (as above versus below a house floor); 3) they are a certain depth (arbitrary levels); and/or numbers of artifacts). For instance, stratum 3 in a particular site may be differentiated from stratum 4 because, in layer 3, 10% of the potsherds found are type X and 90% are type Y, whereas, in layer 4, 80% of the potsherds found are type X and only 20% are type Y.

It is not always easy to recognize strata, however. Thus it may not be feasible to follow natural or cultural strata when excavating a site. So levels of an arbitrary depth may be imposed on the site by an archaeologist as he digs.

Note the following stratification diagram of a hypothetical site. You can see that this site has probably seen a number of different occupations.



ARCHAEOLOGY

It is important in a site to recognize and note the strata in that site. The lowest stratum will be the oldest. It is possible sometimes to cross-date sites by comparing similar strata. Thus if site A had three strata, 1, 2, and 3, and site B had four strata, 1, 2, 3, and 4, and stratum 4 in site B had similar characteristics to stratum 1 in site A, we can deduce that strata 2 and 3 in site A were laid down earlier than all of site B.

Site A		Site B
		1
		2
		3
		4
1		
2		
3		

Studying the stratification of a site can help in assessing the association of objects and their relative ages in this site. A comparison of the strata in all the sites in a region would yield chronological data that would be valuable in writing a cultural history for that region. Also, if one stratum of one site could be dated on an absolute scale, such as on a calendar, then other sites in the region could be dated absolutely by comparison.

ARCHAEOLOGY

TYPOLOGY

There may be hundreds and hundreds of artifacts found in a single site. What, then, can the archaeologist do to bring some "system" to all this data?

We bring order to what we encounter each day by giving things names. We call some of our dishes plates and bowls and cups. We recognize that there are a lot of different individual items that we lump together under these categories. For instance, there are large and small, blue and white, plastic and china plates. We would probably consider saucers plates, but we might have some difficulty distinguishing between some plates with high upturned edges and very shallow, broad-based bowls.

So it is with archaeological data. Relationships in the form and structure of different artifacts are analyzed and criteria are set up for different categories. Artifacts are then classified and put into the different categories. Generally items that are similar are considered to be made at about the same time, though this isn't always the case.

The type is the unit of comparison used with artifacts and thus the setup of named categories is called a typology. There may be "designed" or "discovered" types. The former, which are arbitrarily set up, are commonly used in archaeology. In fact, different archaeologists may use different types (different categories) to describe the same assemblage. Thus it is sometimes very difficult to make comparisons of archaeological data.

There have been attempts to discover types statistically. Attributes of artifacts are described, and then the archaeologist seeks to find combinations of artifacts that are found together so often that finding them together is probably not accidental.

There are some problems involved in setting up typologies of archaeological data. For instance, how much difference should there be between types? How different is different? Also, many archaeologists try to find "ideal" types, things that are made "just right." It is generally true that people have an ideal in mind when they make artifacts, but the ideal in the eyes of the archaeologist may not be the ideal in the eyes of the maker of the artifact. How can we, this many years later, be sure of what was going on in the mind of the maker of the artifact?

How are typologies useful? With typologies, comparisons of artifacts within a site and between sites can be made more easily. Typologies can be used in making chronological scales, and in distinguishing between various strata and various occupations of a site. Being able to describe different kinds or types of artifacts is useful in describing cultures and writing cultural histories.

ARCHAEOLOGY

8. Listen carefully to the reports which your classmates will give on explaining what can be inferred from different kinds of materials unearthed in archaeological excavations. You will want to take notes on these reports.
9. Your teacher will show you two slides. As you look at each slide be thinking about what the things are that are shown, what they are used for, and what the presence of these things might tell about the culture of the people that possessed them

Slide 1

Slide 2

ARCHAEOLOGY

10. Your teacher will show you some slides picturing archaeological finds pertaining to the Archaic period in Illinois prehistory. These slides show your data. Take notes as you watch them so that you can make generalizations about the culture of the Indians living at this time. You will also be asked several questions about the slides.

Slide 1.

Slide 2.

Slide 3.

Slide 4.

Slide 5.

Slide 6.

Slide 7.

Using what you have seen in the slides as your data, write in the space below a description, a "cultural reconstruction," of what the culture of the Indians during the Archaic period in Illinois prehistory was probably like.

ARCHAEOLOGY

11. Your teacher will now show you four slides pertaining to the next period in Illinois prehistory, the Woodland period. Take notes as you watch these slides, paying special attention to any changes which might have occurred in Indian culture between these two time periods. Then answer the questions in your manuals.

Slide 1.

Slide 2.

Slide 3.

Slide 4.

Slide 5.

- a. List some of the changes which took place in Indian culture in Illinois between the Archaic and Woodland periods. (Think about how the lives of the people at these two periods in time differed and whether any aspects of culture were introduced in the Woodland period that were not present in the Archaic.)
- b. Write a brief culture history of the area during Archaic and Woodland times, including some of these changes and how they probably affected the lives of the Illinois Indians. (If you need more space continue on other side of this page.)

12. Check your cultural reconstruction and culture history with other data on the Archaic and Woodland periods in Illinois prehistory. Did you make any wrong inferences? If so, why do you think you made them? Correct the cultural construction and culture history in your manual.

- 121

THE FOOD PRODUCING REVOLUTION
Introduction and Teacher Background

THE FOOD PRODUCING REVOLUTION
BIBLIOGRAPHY

Reprints and articles:

MacNeish, Richard S., "The Origins of New World Civilization," A Scientific American Reprint, Nov. 1964.

Braidwood, Robert J., "The Agricultural Revolution," A Scientific American Reprint, Sept. 1960.

Helbaek, Hans, "How Farming Began in the Old World," in Archaeology, Vol. 12, No. 3, Sept. 1959, pp. 183-189.

Bates, Marston, Man in Nature, * Foundations of Modern Biology Series, (Englewood Cliffs, New Jersey, Prentice-Hall Inc., 1961).

The chapter in this book on "Domestication," Chapter 6, is an excellent and readable summary of a lot of the concepts and data contained in this section. Read it if it is at all possible. Some of your students may want to read it, also.

Caldwell, Joseph R., Ed., New Roads to Yesterday (New York: Basic Books, Inc., 1966). This is a collection of articles from Science, many of which are considered landmarks in archaeological studies. Of special interest are the following chapters:

Chapter 6 - "Animal Domestication in the Prehistoric Near East," Charles A. Reed.

Chapter 14 - "Domestication of Corn," Paul C. Mangelsdorf, Richard S. MacNeish, and Walton C. Galinat.

Chapter 17 - "Agriculture and Urban Life in Early Southwestern Iran," Robert M. Adams.

Chapter 18 - "Salt and Silt in Ancient Mesopotamian Agriculture," Thorkild Jacobsen and Robert M. Adams.

Linton, Ralph, The Tree of Culture (New York: Alfred A. Knopf, 1961).

Chapter 8, "Domestication of Plants and Animals," would provide especially good information on how domestication may have come about, the centers of domestication, and the characteristics of domesticates.

Sauer, Carl O., Agricultural Origins and Dispersals (New York: The American Geographical Society, 1952).

Dr. Sauer is the major defender of the position that agriculture began among fishing people in the tropical regions of the world. He maintains that mountain and hill people, who grow seed crops, learned the basic techniques of planting from tropical forest people, who grow root crops.

THE FOOD PRODUCING REVOLUTION

Introduction and Teacher Background

Wolf, Eric R., "Rise of the Seed Planters," Chapter IV of Sons of the Shaking Earth,* (Chicago: University of Chicago Press, 1959).

This chapter of Dr. Wolf's book is a discussion of how seed planting might have occurred in the New World. Using Mesoamerica as the nuclear region or origin of seed planting, he suggests the interdependence of man and weeds.

ADDITIONAL ACTIVITIES

You might want to ask someone in your community who breeds plants or animals to come and talk to your students on how and why he selects the particular plants or animals he does to get the resulting cultigen he wants.

Perhaps there is a science teacher in your school who would be willing to speak to your class about some aspects of domestication. The teacher could explain plant or animal genetics, talk about some of the relationships between man and the animals and plants (ecology), or clarify, with examples, some of the concepts listed on the following pages.

FILMS

The films Rice in Today's World, The Story of Corn, and The Story of Potatoes have been previewed but are not recommended for use with this unit. They present some interesting information about methods of cultivation (especially The Story of Corn) but give little or no information about the domestication and improvement of crops.

THE FOOD PRODUCING REVOLUTION

Introduction and Teacher Background

THE FOOD PRODUCING REVOLUTION

You will wish to read through this section before teaching it. Read also the two Scientific American reprints: "The Agricultural Revolution" and "The Origins of New World Civilization." Reading them will enable you to teach this section with more perspective and insight.

In this section we are primarily concerned with the process of domestication --what it is, how it came about, and what it has meant for the history of mankind. Thus, the concept "Domestication" is the most important concept in this section.

Dr. Charles A. Reed, a zoologist from the University of Illinois, has been quoted as saying,

This is by far one of the best definitions of domestication. It not only includes the fact that plants and animals are under the control of man but also that breeding is controlled, which often results in forms changed by man.

Domestication probably first began in the period of time known as the Mesolithic. Over a long period of time, men learned to grow crops and raise animals to fulfill many of their needs. Many groups of men became less nomadic; they tended to settle down and cultivate their fields.

Present evidence suggests a number of centers of plant domestication but probably the most important to our culture were Southwestern Asia in the Old World and Mesoamerica in the New World. (Southeastern Asia, where rice and the chicken probably originated, would be the most important center of domestication for much of the world.)

There are some authorities, though, who argue that the idea of domestication probably occurred only once and spread from its place of origin to the rest of the world. After all, man can be a very mobile creature. With this idea in mind, then, people domesticated the plants and animals in their areas.

We will examine the process of domestication that took place in Southwestern Asia and Mesoamerica by examining the evidence uncovered at Jarmo in Iraq and in the Tehuacan Valley of Mexico. Plant domestication appears to have been well underway in western Asia by 8000 B.C. and in Mesoamerica by 6000 B.C.

The developments in these two regions were absolutely independent. As you will discover, the New and Old Worlds contained quite different wild species of plants and animals. The resultant domesticates native to the two regions we will consider are therefore quite different: wheat and barley were domesticated in the Old World; corn was domesticated in the New; sheep, goats and cattle became the domesticated animals of man in the Old World; llamas, alpacas, guinea pigs and turkeys in the New.

THE FOOD PRODUCING REVOLUTION

Introduction and Teacher Background

The plants and animals are different but the process of domestication and the resulting effects on society were strikingly similar in both areas. In both regions domestication seems to have begun in societies that were already collecting wild seeds. These societies doubtlessly had a considerably knowledge of plants and their properties. A degree of sedentary life must have been established in both regions by the time domestication got under way.

Both regions also demonstrate multiple local centers of plant domestication. It appears that from each center sprang a particular domesticate that was added to the growing complex of domesticables. There is also evidence of extensive hybridization (the crossing of plants, or animals, of different varieties or races or species) in both regions. The hybridization brought about plants with new and different characteristics and man could then choose the sturdier and more useful plants to cultivate.

It might be instructive to think of domestication as the impetus of a chain reaction that is still gaining momentum. Human technology was crude, simple and unsophisticated 15,000 years ago, having changed but very little in the preceding one and a half million years. The momentum of our technological advances today are difficult to grasp.

In our study of the food producing revolution, we are primarily concerned with the process of domestication and its effect on human societies. We will later study about two nuclear zones of incipient agriculture, Mesoamerica in the New World, and Southwest Asia in the Old World in order to understand the process which laid the foundation for complex civilizations. For,

Man's primary adaptive mechanism is not his changing morphologically. His adaptive mechanism is his culture; he can make clothes instead of growing a long coat of fur, he can build adequate shelters, and, most importantly, he has learned to manipulate his environment. One of the most effective manipulations that man has learned has been the domestication of plants and animals. Through domestication and advanced technology man has gained the upper hand; he has become the conqueror of his environment, the globe.

THE FOOD PRODUCTION REVOLUTION

Class Procedure

RECOMMENDED TIME TO SPEND WITH THIS SECTION: 5 days.

1. The day before starting the "Food Producing Revolution" have your students, as an assignment, list all of the items they had for their last full meal (dinner or lunch unless your students take time for an unusually large breakfast) and find out where (and, if possible, when) these items were first grown by man. (If all your students eat the same cafeteria meal, use the dinner meal in the assignment.) Dictionaries and encyclopedias often give this information.

61

Example:

Item	Where First Grown by Man
peanut butter sandwich	
1. peanuts	peanuts - Brazil
2. wheat	wheat - Southwest Asia
milk	milk (cattle) - Southwest Asia
potato chips	potatoes - South America
apple	apple - Western Asia

Start the class discussion by asking several students to read their lists. Put the items and where they were first grown by man on the board. There will probably be disagreement about where several items were first grown. That's all right; it sets the stage for understanding the nature of our present knowledge about domestication. Much of our knowledge is speculative, and there are many disputes. We will review many of these issues and present the evidence as it stands today. Ten years from now, the story of domestication may be entirely different; certainly many of the gaps in information will be filled in by further research.

What plants and animals were first grown in the region that is now the continental United States? Have your students guess and make a list of their suggestions on the board. It will surprise them, no doubt, to discover that virtually no domesticable plant or animal had its origin in this region. Perhaps sunflower seeds and a few species of squash trace their origin to North America, but our important cereal crops were brought into this rich land after they had been developed elsewhere.

Ask your students approximately how long they think it took for man to learn to plant and grow crops.

Project Tr. 114, Population: World, 4000 B.C. - 1960 A.D., on the screen. What caused the long, slow upward trend starting at the far left side of the graph? Man's learning to grow food. Be sure that your students are aware of the long time it took for domestication and an increase in food production. Does the sharp jump in the graph which

THE FOOD PRODUCING REVOLUTION

has been explained by the industrial revolution have anything to do with food production? Yes, more and better agricultural tools could be produced. Make sure that your students understand the relationships involved here. More food → more men can live, more leisure time and all that follows from that → more food needed for more people → etc., etc.

Ask your students what they think the word revolution means. It usually indicates a violent struggle accompanied by destruction and bloodshed. Is there another meaning for the word revolution? What else does the word signify? Some of your students may have read ahead and they will know what is meant by food producing revolution. If your class hasn't read ahead, it would be profitable to spend about five minutes on the meaning of the term "food producing revolution." You might read the definitions of revolution in the dictionary, one definition is "total or radical change." This is the meaning we are interested in--the change in cultures caused by food production. This revolution was not violent, it was quiet; it was not bloody, but instead passive; it was not rapid since it took some six thousand years to reach completion. This revolution is but the first of several revolutions in cultural history. The urban revolution, the industrial revolution, and the technological revolution followed it relatively rapidly. Are we now experiencing an atomic revolution? Some think so.

63

2. Have students read the review article and the pieces about cultivation and domestication and answer the questions. Your students should recognize that cultivation and domestication do not refer to exactly the same thing. Domestication is the much more inclusive term. A domestic plant or animal is not merely grown or tamed, but it is also bred.

Can your students explain the history of man in terms of food? It is hoped that they will recognize that in the course of history, man has endeavored to provide for himself a more and more secure food supply. He learned to preserve food by smoking, drying, pickling, salting, and freezing it. He learned to store it for future needs. And then he learned to control it and grow it himself. He learned to breed it and improve it. And the process is still going on. Research is being done today to develop new and better cultigens and ways of growing them to get the fullest possible return for the effort expended. This is one of the primary ways men today are trying to solve the world's population problems.

The Food Producing Revolution, also called the Agricultural Revolution, is an excellent example of how man used his culture to influence the environment in order that he might have more of his wants satisfied and have the wants satisfied better.

THE FOOD PRODUCING REVOLUTION

3. Have students read the article "The First Domestication" in their manuals. How does this hypothesized account compare with their accounts? Why do they think the author selected women as the originators of food production? Today, men do much of the heavy work connected with agriculture. Under what circumstances do your students feel this came about? The following quotation is included here for your information. It must be remembered that no one knows exactly how food production came about. Those who could tell us, if we could somehow understand them, have long since been dead.

64

4. Which do your students think came first, plant or animal domestication?

65

No one knows exactly how the first animals to be domesticated were domesticated. It is probably true, though, that agriculture came before the domestication of animals. Hunters and gatherers had less time to tame animals. Also, it would have been more difficult to tame animals and keep them with a nomadic group.

5. The following optional readings are concerned with two opposing views about the origin of agriculture. The major supporters of the seed-crop origin hypothesis are Braidwood, "The Agricultural Revolution," Helbaek, "How Agriculture Began in the Old World" and Wolf, "The Rise of the Seed Planters." A growing number of scientists are supporting the root-crop origin hypothesis put forth by Carl O. Sauer in Agricultural Origins and Dispersals, The American Geographical Society New York, 1952. You might be interested in reading "Origin of Central Andean Civilization: New Evidence" by Donald W. Lathrap in Science, May 7, 1965, issue. This article is a review of an archaeological monograph publishing the findings of an excavation undertaken by the University of Tokyo in 1960 which tends to support the root-crop origin hypothesis.

65

THE FOOD PRODUCING REVOLUTION

Have your students read about both arguments--for the Southwestern Asian seed crops being first and the Southeastern Asian root crops being first. After reading the articles and discussing them, have each student write a statement about which position he supports, giving his reasons. There is no right position; neither position has been conclusively proven or disproven.

If your students are interested in exploring further this question of whether seed or root agriculture came first, you might have several students give reports on particular seed or root crops.

- 71 6. Ask your students what they think would be important features of domesticated plants that are staple foods. Two of these features would be storability and a high yield per acre. The plants would also be nutritious.

Transparency
?

Either have students read the article on wheat or the article on corn (They may want to choose. If you use "Wheat: The King of Cereals," you may want to use Tr. 103 to show the distributions of wild wheat and barley.) and answer the questions or have individual students choose important plant domesticates and answer the questions. You might want to merge activities 6. and 7. and have each student do research on a plant or animal. Be sure that some of the less familiar plants and animals, such as the yam, manioc, sorghum, millet, llama, etc., are included.

Discussion of the questions would then bring out the importance of nuclear areas (where a plant or animal is located in a wild state), areas where there are the most varieties of a plant or animal, and archaeological evidence (where it is available) in ascertaining the center of origin of a particular domesticate.

The third question should also bring out some of the important results of domestication in changing plants and animals.

There have been four important results of domestication. First, when men began interfering in the reproductive processes of plants and animals, they were unknowingly interfering in the natural balance that had been established by those species and their environments. This sometimes resulted in the extinction of the plant or animal. A lot of wild animals died after only a short time in captivity. If large numbers of people were trying to "tame" the same specie and were also unsuccessful, it might result in the extinction of the specie.

Also, human interference has brought about new varieties, breeds, and even species of plants and animals. This usually occurs when the wild plant or animal is able to adapt to its new environment. Through human manipulation, changes or mutations occur, giving rise to variation in the species (called breeds or varieties). Sometimes the changes are drastic enough to create new species. How many breeds of dogs can you name, or breeds of horses or cattle? Is there only one specie of wheat or corn?

THE FOOD PRODUCING REVOLUTION

Not only have new species been created, but both new and old species have been changed by man to better fit his needs. Thus corn has been bred for bigger ears and kernels. Cattle are bred for better beef or for increased milk production.

The fourth important result of domestication is that, as plants and animals come under the domination of human societies, they often lose their ability to reproduce without the aid and care of man. These cultigens, which are helpless without man, are called obligate cultigens, in contrast to the facultative cultigens, which can still exist by themselves. The original natural selection of man's domesticates has been relaxed and replaced by human selection.

We can certainly say that man and his domesticates have a mutually dependent relationship. Many of the plants and animals we have changed into artifacts through manipulation cannot survive without our care.

Because of domestication, however, man has been changed, too. His way of life has changed. The vast majority of cultures today depend on their domesticates for subsistence and survival. Can your students imagine what would happen if all man's crops were to fail and his domestic animals die? Certainly most men would die, too. There are really very few wild plants and animals existing in useful concentrations today. And few people know how to recognize, obtain, and use them.

7. Ask your students how they think the first of what were to be man's domesticated animals was probably tamed. What was this first animal? Actually no one really knows how domestication came about, but there have been various theories put forth. Most authorities believe that the dog was the first domesticate. The dog or its ancestor probably hung around man's campsite to eat the scraps of food man left. It was a scavenger. Perhaps men ate dogs. It is more likely, though, that, except perhaps in times of starvation, dogs were treated as pets and not eaten. Cattle may have been an early domesticate, too, as a few cattle may have been used as decoys in hunting large herds of cattle.

81

What would be some of the characteristics desired in the animals domesticated? (1) Your students should recognize that the animals must be able to breed in captivity. Every so often, even today, we hear of zoo animals, which have not bred in captivity before, breeding. So it may have been with the early domesticates. After a time, man was able to breed them.

(2) The animals must have been strong enough to survive abuse and neglect. Probably animals were not always fed enough or fed the right kinds of things. They may have been tied or penned and forgotten for a time. Your students themselves may have unthinkingly left pets in this situation. The bones of some early domesticates are lighter and softer than the bones of their wild counterparts. This may have been due to improper feeding.

THE FOOD PRODUCING REVOLUTION

(3) The animals must stay near the campsite. The dog, for instance, would have wanted to stay near his food source, man's garbage.

(4) The animals must have been fairly docile enough for man to control them. Later on, he bred them to increase docility.

(5) The animals had usefulness for man. He bred his domestic animals to increase their usefulness. This usefulness was not limited to food, either. Man used animal hides. But, more important, he used animals to help him with his work, a sort of revolution in energy.

Have your students either read the article about the domestication of the dog and answer the questions about the article or have several students choose domestic animals and give reports answering the same questions in the course of their reports.

Introduction to the Study of Domestication

The Dog: Canis Familiaris

You may follow this procedure if you use the article in the manual.

Ask your class how many have dogs or have had dogs, what kinds they are or were, and whether or not they are pure breeds. In order to get a general idea of the range of variety of dogs owned by your students it is advisable to restate or list on the board the breeds of dogs represented. Now ask your students if all of these breeds sprang from the same ancestor. Ask if all of these varieties and breeds belong to the same specie. Your class will probably know that, yes, all dogs belong to the same specie and to the genus canis. Ask if anyone knows what the ancestor to the domestic dog was, where the dog was first domesticated, and how the dog was first domesticated.

It would be wise to note some of the hypotheses on the board so the students can refer to them after they have read the following article, "Canis Familiaris--The Domestic Dog."

Ask your students to describe the different kinds of data which were brought out in this article about the what, where, when, and how of the domestication of the dog. See if they can pick out archaeological data and make some suggestions about how the field of archaeology may contribute to the study of domestication.

Your students should realize that man has bred dogs to suit his needs. Thus dogs have been changed by man. Many new varieties of dogs exist because of man.

THE FOOD PRODUCING REVOLUTION

8. Consider with your students the importance of domestication to man and his way of life. (See the teachers' notes in activity 6.) Have students write paragraphs on "The Importance of Domestication." The following article may give you some clues for discussing these paragraphs.

The Importance of Domestication

Probably one of the most important events in human prehistory was the domestication of plants and animals. It has only been in the past twenty years that we have come to realize the importance of the role of domestication in shaping human societies.

About 15,000 years ago the main sources of subsistence of human population on the face of the earth were hunting and gathering. The search for food was more than likely an all consuming occupation, requiring every waking hour of every day of man's life. Small bands of hunters and their families followed the herds of large game that were plentiful during the ice age, but by about 10,000 B.C., the big game herds were becoming scarce, and human groups out of necessity began gathering plant foods in greater quantities. Archaeological remains point to a slow transition from big game hunting to hunting and gathering between 15,000 B.C., and 10,000 B.C.

Today, roughly 12,000 years later, there are only a few societies that pursue a hunting and gathering way of life. Hunters and gatherers make up roughly .001% of today's total world population. In 12,000 years they have been reduced to a few rare groups, isolated from the rest of the world, engaged in a similar but not identical way of life to the life of the hunters of long ago. The Bushmen of the Kalahari Desert of South Africa and the Australian Aborigines are two examples of surviving hunters and gatherers. Did the food producing revolution have anything to do with this reduction? What happened to the total world population?

Another important question is: How much do we depend today upon domesticated plants and animals for survival? We can ask ourselves: What would the United States do if suddenly all of our domesticated plants and animals were to disappear? What would we eat? Could we make all of our clothing from synthetics? How many industries other than food and clothing industries would grind to a halt? It is startling to realize how much we depend upon domesticated plants and animals today. In the process of harnessing one of the greatest resources known to man--food production--man became the servant of his plants and animals, thereby changing his whole pattern of life. By becoming dependent upon the steady and ample supply of vegetable food derived from his fields and animal food from his barn, man no longer ranged the grasslands and mountains in search for food. He settled into a sedentary village farming pattern of life. The seemingly simple act of domestication transformed human societies. What did this transformation involve? We shall discover this as we study about Mesopotamia and Peru in the weeks to come.

THE FOOD PRODUCING REVOLUTION

1. How long do you think it took for man to learn to plant and grow crops and tame animals?

Why do you think it took this long?

FOOD PRODUCTION

As we begin this section about man's learning to produce his own food, let us review for a few minutes. How did men live before they learned to grow food? How did they provide for their basic needs? Then how did this change as men learned to grow food?

We have seen how the fossils leading up to Homo sapiens have been classified according to their physical characteristics. Cultural characteristics of early man have been used to divide large blocks of time into periods, also. The three periods of time which we shall discuss here are the Paleolithic, the Mesolithic, and the Neolithic. "Paleo" is a prefix derived from Greek which means "old." The Paleolithic lasted from about 500,000 years ago till about 10,000 B.C. The Mesolithic is a "middle" period, a transition period between the Paleolithic and Neolithic. The "Neo" of Neolithic means "new." During the Neolithic Period, which began about 6000 B.C., man was following a new way of living. It must be remembered that the transitions from one period to another did not occur at the same time in all parts of the world. Also, the transitions were very slow.

During the Paleolithic period, which includes all the cultures up to and through the Neanderthal cultures, men lived mostly by hunting and gathering. Thus they moved around in search of food, but only when a new spot would mean less effort in getting the food. The people who had a more stable food source, such as those people who lived where fish were abundant, did not have to move as much.

Sometimes these people of the Paleolithic have been described as "cave men," but we know that this is too simple a term. There were different kinds of men and different cultures, not just one culture. In cold climates, such as in Europe during the glacial times, many men did live in caves and bluff overhangs, but, in general, men of Paleolithic times probably lived in the open. They learned to build shelters. Soon their shelters were shared by nature's opportunists, weeds and insects and small animals, such as mice.

Men learned to use fire quite early, probably many millennia before he could make it. By 25-30,000 years ago, he was making his own fire. Fire not only made meat more tender and palatable, but it enabled man to cook vegetable foods such as roots and seeds, that otherwise would have been difficult to eat. Man also used fire in wood-working and felling trees.

There is a division of labor which is characteristic of hunting and gathering peoples today which was probably also characteristic of Paleolithic man. Thus we can say that the Paleolithic men did the hunting and the women the gathering.

THE FOOD PRODUCING REVOLUTION

Men searched, often in small groups, for wild game, which they brought back to the "home fire." The meat was then cooked and eaten. Women scraped and prepared the hides for use. Women gathered wild roots, greens, seeds, fruits, nuts, and insect grubs while the men hunted. The women also cared for the small children.

The Paleolithic people used tools made of unpolished stone, bone and ivory. They probably used tools of wood and baskets of grass and perhaps also nets and snares, but few evidences of these have been preserved. Some of the tools used were the basic forms of what we now call the axe, hammer, plane, and knife.

Near the end of the Paleolithic period, men were also burying their dead with weapons and red ochre. Thus, they probably had some belief in an afterlife. They were also drawing animals on cave walls. Perhaps they believed these drawings would help them in hunting or would make game plentiful.

The population during Paleolithic times was probably very small compared to today's population. There were probably not more than 100,000 people on the whole continent of Europe. These people lived in groups of 4 or 5 families. Certainly no more than 200 could have been in a group or there would not have been enough food in the area for all.

Around 10,000 B.C., a climatic change was taking place. The glaciers which had covered much of the Northern hemisphere were melting. It was warmer and wetter. Fishing and water-side hunting and collecting were more important. Waterways were used more for travelling and communicating with other people.

During this time, which has been called the Mesolithic, composite tools (tools composed of several parts) were being used. Pottery was invented, though it was less elaborate pottery than would be used later. Fish poisons were probably used as they are still used in parts of Southeast Asia and the Pacific islands today.

During this period some even more important changes for the course of man's history were taking place, though. There was a revolution taking place in man's methods of getting food. In one Mesolithic site in Southwest Asia, men were using polished sickle flints to harvest barley, wheat, oats, and rye. They also ate onions, cucumbers, pears, almonds, grapes, figs, olives, dates, plants of the beet-cabbage family, and were using flax. There is evidence of cattle, sheep, goats, donkeys, and the dromedary camel. Of course, grain was harvested before it was cultivated by man and animals were eaten before they were raised by man, but it was during the Mesolithic period that man did learn to cultivate grain and raise animals for his own use.

The Neolithic period is considered as beginning when man was dependent on his crops and animals for his basic subsistence. This dependence caused basic changes in man's way of life which we shall consider later.

THE FOOD PRODUCING REVOLUTION

Cultivation

We have seen that man probably first began to cultivate crops for his own use in the Mesolithic period. "Cultivation" has been defined as "the deliberate sowing or planting of a prescribed area to produce a predictable crop." (Calder, Ritchie. After the Seventh Day. New York: The New American Library, 1961, p. 59) Cultivation is thus consistent with a nomadic life. Groups of people probably planted corn or wheat or yams, etc., and then came back to them at harvest time to gather whatever had been left by insects and field animals.

1. What do you think would be some of the characteristics (including the available resources) of a likely environment for early experiments with cultivation? Why did you choose these characteristics (or resources)?

Domestication

To cultivate crops, men don't have to make many changes in the plants. Our food plants and animals would not be as productive as they are today if man hadn't done more than cultivate them. What he did was to domesticate them.

A professor at the University of Illinois, Dr. Charles A. Reed, is very interested in the problem of the origin of animal domestication. He explains what domestication means to him as follows:

1. So, in your own words, what has man done to make his food sources more stable and productive?
2. How do you think this first domestication came about?

THE FOOD PRODUCING REVOLUTION

3. Read the following article and compare this account of the first domestication with your account. How is it similar or different?

THE FOOD PRODUCING REVOLUTION

4. Which do you think came first, plant or animal domestication? Why?

5. Where do you think agriculture began? Refer again to the question about a suitable environment for cultivation. Check your world map. List what you think are the best possibilities below.

Now read the articles "Southwest Asia: The Cradle of Agriculture" and "Southeast Asia: The Cradle of Agriculture."

- a. Outline below the arguments for Southwest Asian seed crop agriculture as being first:

Seed Crops First

- b. Now outline below the arguments for the root crops of Southeast Asia being first:

Root Crops First

- c. What position do you hold on this question and why?

THE FOOD PRODUCING REVOLUTION

SOUTHWEST ASIA: THE CRADLE OF AGRICULTURE

Man's First Domesticated Plants--Seed Crops?

Many scientists believe that seed crops, crops which propagate themselves by spreading seeds, were the first kind of crop domesticated by man. Some of the major seed crops are wheat, barley, rice, corn, and millet. A great deal of archaeological evidence supports this position.

To date it is believed that the earliest attempts at food production took place in the Near East, perhaps as early as 10,000 B.C. The primary plants domesticated were wheat and barley--seed crops derived from wild grasses native to the region.

What was the chain of events which probably occurred in the domestication of seed crops? Perhaps it was something like this. Men had been obtaining much of their food from hunting but also some of it from gathering wild vegetable foods. As the large herds of animals began to die off with changes in the climate somewhere between 15,000 and 10,000 B.C., gathering became more and more important. People learned the reproductive cycles of the wild grasses and weeds on which they depended. They returned each year to the same stands¹ of wild grass or weeds. Eventually, perhaps, each group of people had several "stands" they called their own.

Most of the plants in a stand of wild grass ripen at about the same time. Then normally the seeds fall off. Harvesting a large stand would be easier and quicker if many people worked at once. Then more of the seeds would not fall off before they could be harvested. With many people working together, there would need to be some kind of leadership or organization so

1. Stand--a natural clump of wild grass or a large area grown over by weeds.

THE FOOD PRODUCING REVOLUTION

people wouldn't get in each other's way. With a large group of people living near such a stand for harvest season, there would be a "semi-permanent village-like settlement." Perhaps the group returned to this settlement each year at harvest time.

Eventually, it is argued, these gatherers learned to scatter seed upon the ground, and to plant. Weeds and men were found together, human beings providing the disturbed soil for the plants to germinate, and the weeds and grasses providing grain for the human diet. In harvesting the stands of weeds, seeds could have been accidentally or intentionally planted. Perhaps two or three thousand years later, people began to notice a new variety--a domesticated cereal grain. As man moved around he could have spread the new variety to different areas, thereby helping it to find a "niche" of its own, safe from excessive competition. Have you ever wondered why someone says that weeds are choking out their garden? The weeds don't need human care; domestic plants do. If the wild plants had been moved from their original home and evolved into a new variety or breed, it is very likely that they would have needed the care and protection of man, also.

Seed and grain-bearing plants have some important characteristics as early cultigens.¹ The seeds and grains are very obviously located above the ground and are thus easier to see and to harvest than some roots. They can also be easily stored and transported. Sometimes grain that has been stored in dry climates for several hundred years will still germinate if it is planted. Surplus grain could thus be accumulated so that it could be used to "tide people over" in bad times or to release some people's labor from agricultural tasks. A third important characteristic of seeds and grains is their high yield per acre. A lot of seeds and grain can be gotten from a relatively small area.

It has been estimated that today in the northern part of the alluvial plain of Mesopotamia a man can support his family on 249 mandays of agricultural labor per family per year. In the New World (Mexico), with corn as the basic crop, a man can support his family on 143 to 161 mandays of labor per family per year. This is quite a difference from the early hunters and gatherers who spent so much of every day searching for food.

The old saying that necessity is the mother of invention does not hold up well with the present evidence about domestication. Domestication evidently came about by "accidents" followed by long periods of experimentation. The first "domesticators" probably did not realize what they were creating. It is also evident that agriculture did not originate from a chronic shortage of food.

Thus agriculture

must have arisen where there was already an ample supply of food.

Wolf, Eric R., "Rise of the Seed Planters" Chapter IV, in Sons of the Shaking Earth, University of Chicago Press, 1959.

Helbaek, Hans, "How Farming Began in the Old World" in Archaeology.

1. cultigens--include both cultivated plants and domesticated animals.

THE FOOD PRODUCING REVOLUTION

SOUTHEAST ASIA: THE CRADLE OF AGRICULTURE

AN ALTERNATIVE VIEW: Root crops not seed crops were the first domesticates.

From the foregoing reading one might expect that the very first experiments with agriculture occurred in the general area of the Near East. Many experts hold that man's first agricultural efforts involved the domestication of seed crops such as wheat and barley and that man first harvested the wild grains and then planted and cultivated them. We can guess this took place possibly 10,000 years ago somewhere within the natural habitat of these wild grasses.

However, there is an alternative view proposed by Dr. Carl Sauer, who has done research pertaining to human geography. He has proposed Southeastern Asia as the cradle of earliest agriculture, and he does not believe that the first experiments in planting involved the planting of seeds. He believes that man first planted a root, or a stem cutting, or a piece of a tuber, thereby getting an identical reconstitution of the parent plant. It would be easy, for instance, to pull a potato plant out of the ground, cut off part of the potato, and stick the plant with its little piece of potato back in the ground.

The first "planting" of root crops was probably quite accidental. People probably dug out the roots, ate what they wanted of them, and threw the garbage away. In the garbage dump were enough pieces of the roots that root plants started growing all over the garbage dump. Have you ever planted potato peelings and found later that little potatoes were growing? From this people might have gotten the idea of putting little pieces of root into the ground.

THE FOOD PRODUCING REVOLUTION

Some new and different ideas about the origins of domestication have been proposed by Carl Sauer. The following are some of his ideas:

1. People who have a hard time finding enough food probably were not the first to domesticate plants and animals. They wouldn't have enough time to experiment with growing crops.
2. Domestication probably began in areas where there was a wide variety of plants and animals to experiment with.
3. Large river valleys requiring knowledge of how to control floods or irrigate crops were probably not the seat of domestication.
4. Agriculture probably originated in wooded lands since it was easier to kill trees than to eliminate tough grasses.
5. Peoples who were most given to hunting probably did not originate agriculture.
6. The first agriculturalists had to live in one place so they could watch their crops and keep animals from eating them.

THE FOOD PRODUCING REVOLUTION

6. Read either of the following two articles (on wheat and corn) and then answer these questions:
 - a. Approximately when and probably where was wheat (or corn) first domesticated?
 - b. What kinds of evidence have been used to ascertain the origin of domestic wheat (or corn)? List them below:
 - c. How has domestication by man changed wheat (or corn)?

THE FOOD PRODUCING REVOLUTION

Wheat: The King of Cereals

Wheat covers over 480 million acres of cultivated land in the world, and more than eight trillion bushels of it are produced each year. This is more than any other vegetation cultivated by man. Specialized varieties of wheat are grown from the North Cape to the Equator, from Ireland to Japan, and from nine hundred feet below sea level in the Jordan Valley to more than twelve thousand feet above sea level in the Himalayas. There are 14 species of wheat surviving today. (See the following page for illustrations of different species of wheat.)

Barley is the second most important cereal grown today and its distribution parallels that of wheat. In fact, wheat and barley were probably first domesticated together, quite by accident. Today wild barley still grows as a weed in the wheat fields of southwestern Asia, where the two grasses were first domesticated. In the course of harvesting the wild wheat, early gatherers cut the wild barley, also, thus bringing barley under human domination.

It is axiomatic that domestication of a plant began where that plant was available in the wild state. Botanists look at the distribution of a wild plant today in order to reconstruct its distribution in ancient times. Wild barley is distributed from Turkestan to Morocco, an extremely large region. Wild wheat is found in Asia Minor and Syria, parts of Greece, Palestine, Transjordan and the Zagros Mountains. The search for early evidence of domestication of wheat has centered on the portion of the above mentioned area known as the Fertile Crescent.

The Zagros Range is one of the few remaining areas of the world where wild barley, wheat, millet, and rye still grow. The mountainous region receives from twenty to forty inches of rain annually. Several varieties of nuts, berries, snails and rodents also abound in the mountains and hills. Paleozoologists tell us that the Zagros Range was once the home of wild goats and sheep as well as the wild pig, wild cattle, the onager (a relative of the horse), the wolf, the fox and the deer. This region, therefore, would be a likely spot to look for evidence of very early domestication and settled life.

This is exactly what has been done. Archaeologists have gone to the Zagros Mountains to look for, to dig into, and to study early farming communities. It had long been suspected that the Fertile Crescent would one day prove to be one of the regions of the world where agriculture first began. It was even hypothesized that this area would prove to be the origin of Old World agriculture. But today it is believed that the Food Producing Revolution took place independently in several places at various times. Different environments offered different complexes (groups of species) of plants and man learned first to collect them, then later to plant, and finally to really domesticate them. This process started a chain of changes which revolutionized human life. Man changed from a hunter and gatherer to a farmer and eventually to an urban Chicagoan, a New Yorker, a Londoner, a Parisian or a Muscovite.

THE FOOD PRODUCING REVOLUTION

Perhaps the earliest attempt at food producing took place in the foothills of the Zagros Mountains in Iraq. The 14 species of modern wheat trace their ancestry to two wild grasses, Einkorn, a small grained wild wheat, and Emmer, a large grained wild wheat.

Barley and wheat are the most adaptable and versatile of cultivated plants. Only these two grasses have been capable of producing forms able to adapt to a wide range of climates, soils and altitudes. The early gatherers, entirely by chance, happened upon the two grasses with probably the highest potential for cultivation. This chance happening, the gathering of wild wheat and barley was perhaps the most fortuitous accident in human history, for the domestication of these two cereals made possible the development of western civilization.

There were some differences among wild wheat and barley plants even before man began cultivating them. The normal wild plants have a very brittle stem that breaks at maturity. The grains are then released and carried by wind and animals, some of them falling on good soil and germinating. Sometimes, however, wild cereals produce a few plants with a recessive tendency to develop a tough stem. These few tough-stemmed plants have lost their ability to disperse.

The early gatherers evidently preferred the tough stemmed plants to the brittle ones. They could harvest more grain from the tough ones simply because, as they harvested brittle ones, the grains fell to the ground and were lost. Eventually only the tough-stemmed plants were selected. This was the actual act of domestication: the tough-stemmed plants could not disperse naturally; they had to be planted by man. All of the domestic species of wheat and barley have a tough stem; consequently, they are completely dependent upon their cultivator for survival.

Later on we are going to study about the earliest known farming-village in the Old World. Domestication of wheat and barley was far advanced by the time the village was established in 7000 B.C. The wild wheats and the early domesticated variety of wheat found at Jarmo are of a type that have a hard husk that cannot be removed merely by threshing. The people of Jarmo had to parch these wheats and the heating made the husks easy to rub off, allowing the kernels to be more readily chewed or ground into meal. The kernels found are carbonized as if they had been over parched. So our archaeological evidence for the domestication of wheat depends upon kernels of wheat that the housewives of Jarmo overheated or burned! After the kernels of wheat were parched and ground, the grains were soaked and a gruel or porridge was made. One might call this the earliest ancestor of cream of wheat. If the gruel was allowed to stand in a warm dwelling for a few days, it could have become infected with wild yeast, and, if a little sugar was added to this, a mild alcoholic drink similar to beer resulted.

Also, if industrious housewives noticed that if they left the gruel for a few days and then baked it, the result was a bread much lighter and not as tough as the original loaves or cakes of unleavened bread. Possibly this is how the art of breadmaking began.

THE FOOD PRODUCING REVOLUTION

FEEDER OF MEN: CORN

The Growth of New World Agriculture

Wheat, barley, rye, millet and rice are the important seed crops domesticated in the Old World which made possible the rise of large populations and complex civilizations. In the New World, however, American Indian civilizations were dependent upon another crop to fill the empty stomachs of the growing numbers of farmers, laborers, priests, administrators, and merchants who carried out their daily tasks in the cities and villages of ancient America. This famous plant was corn, still the staple of Latin America and an important supplement on the dinner table in the United States.

Our idea of corn as a huge yellow ear, boiled or roasted and smothered in butter, is far from its original role. In the United States, much corn is picked green while the kernels are still tender and juicy and is then prepared as a vegetable. Traditionally, however, most corn is left to ripen until the kernels are hard and dry and can be ground into corn meal--a flour which has still not completely disappeared in parts of the United States, as corn bread will testify.

Corn, like the Old World cereals, is a grass. Since there is no satisfactory evidence that corn existed in the Old World before Columbus' memorable voyage, our research for its origin need not go beyond North and South America.

As you remember, the earliest men in the Americas were hunters of great animals and trappers of smaller game, and though they undoubtedly consumed much plant food, they knew nothing of agriculture. Wild roots, seeds and berries were collected by the early hunters, but they did not intentionally plant seeds in the soil to grow plants. It is likely that the hunters, who constantly followed herds of game animals, were never in one place long enough to become familiar with the reproductive cycle of plants. Or, perhaps, a migratory group of hunters could not be bothered with the investment of time necessary to plant because they had to follow the herds and might not be nearby to protect the fields or harvest the yield.

At the end of the ice age, climates became warmer and drier. This climate change, combined with the intensive hunting practices of man, apparently caused the extinction of some animals and a great reduction of most other game. Out of necessity, man became increasingly dependent on the collection of plant foods along with hunting, trapping and fishing.

By the seventh millennium B.C., small groups of men and women were eking out a meager existence in various regions of the Americas. Their continued success depended on intensive exploitation of the local resources combined with growing knowledge of the environment. Operating in a small area, the increased familiarity with plant production and regenerative cycles probably prepared man for the monumental step from food gathering to food production.

Where was corn first planted? Was it in South America or North America? By the time Columbus arrived, corn could be found from the St. Lawrence River in North America to Northern Chile in South America, and it supported great civilizations in both continents.

THE FOOD PRODUCING REVOLUTION

Feeder of Men: Corn

Corn is now such a completely domestic plant that it is dependent on man for continued survival. The seeds, or kernels, are firmly attached to the cob and covered by a tough husk, making it impossible for the seeds to fall to the earth naturally. Botanists realized that early, wild corn would have had to be very different from domestic corn and they began to search for living wild ancestors of present day varieties. It was also felt that wherever wild species grow would be a likely place for domestication to have taken place thousands of years ago. But, after many years of searching, no wild corn could be found. Many botanists concluded that the Central Andes Mountains of South America must have been the point of origin of corn due to the vast numbers of varieties found there. It was believed that the nuclear zone of corn agriculture should have the greatest number of modern varieties. The longer period of time of primitive corn in the nuclear area would have allowed for more evolutionary development.

More recently however, fossil pollen grains have been found in drill cores from the sediments of Central Mexico. They are considered to be over 50,000 years old, which points to Mexico as the home of wild corn and possibly the first domestic corn. Archaeologists, following this lead, began a series of excavations in dry areas, and especially caves, where ancient plant remains would be preserved. After many seasons of work in Mexico, a tenacious archaeologist, Richard MacNeish, and a corn genetics expert, Paul Mangelsdorf, pieced together a complete sequence. In Central Mexico, only 150 miles southeast of Mexico City, they could demonstrate the evolution of culture from hunters and gatherers through early farmers to city builders. Corresponding with this was the evolution of corn from a wild grass of low productivity into the modern varieties of Mexican corn.

The earliest people of Dr. MacNeish's sequence were crude hunters and gatherers who constantly wandered about in search of food. They used chipped stone projectile points, knives and scrapers and knew no agriculture. By about 7000 B.C., however, these tiny bands of men were becoming increasingly dependent on collections of plant foods. Possibly by 5000 B.C., one plant was already being cultivated, the squash. Tools of the period include grinding stones, to grind seeds and roots, as well as crude choppers, which may have been digging implements. Wild corn was probably one of the many sources of food collected during the yearly cycle of migration.

These hunters and gatherers probably shared a common tradition with the early desert cultures of northern Mexico and the western United States. In the "Grest Basin" and southern California, similar cultures survived until the arrival of missionaries and frontiersmen. They were found to practice occasionally the crudest form of agriculture--casting seeds upon the ground or channeling river floods over natural grasslands. Plants were not tended and most of the daily meals came from wild sources, as was also the case in ancient central Mexico.

After 5000 B.C., the incipient farmers began to experiment with new plants, including corn. Corn was then of low value with a cob less than an inch long, and it could hardly have fed many people. Thus, for some 2000 years, family groups must have returned periodically to natural stands of wild vegetation to plant and tend and eventually harvest what was not more than 10% of their dietary need. None the less, the foundations of modern

THE FOOD PRODUCING REVOLUTION

Feeder of Men: Corn

agriculture were being laid. Added to cultivated corn and squash were varieties of beans, chili peppers, gourds and other plants. Population was slowly increasing, too, and we might infer that religious specialization was developing as well. A vast area was probably participating in this slow change to exploitation of domestic plants. Archaeological remains from southern Mexico to the border with the United States show that corn was slowly spreading. Other areas had different domestic plants, too, and there was probably a lot of exchange.

It was not until after 3000 B.C. that there was any hint of village life in Mexico. By that time, however, corn had undergone considerable changes and was much larger, though still primitive by modern standards. Logs were kept and cotton was grown. Stone bowls and baskets were manufactured. The early farmers were still dependent on wild plant resources, however. Agriculture did not supply more than 30% of the nutritional need of the still small population.

In far off Peru, we have abundant evidence for a similar development. Agricultural villages of a primitive nature appeared on the coast of Peru by 2500 or 3000 B.C. Corn was not included in the crop inventory of early Peruvian agriculturalists and dependence was on other crops, especially certain South American roots as well as beans, squash, and gourds.

Still another thousand years elapsed before a considerable number of people were living in villages and getting most of their food from farming. At about this time, in both Peru and Mexico, pottery made an appearance and ceremonial structures were first erected.

In such a manner the transition from food gathering to food production brought about a new way of life in the New World.

It was hardly a revolution fought with violence or growing pains, but rather a slow and gradual transition over 40 centuries. A cycle was initiated in which man became more dependent on plants and consciously or unconsciously selected better seed for planting. Eventually plants improved; new varieties evolved which better satisfied the needs of the human planter. Careful tending by the hands of sedentary farmers yielded greater productivity. Some 4000 generations of corn and almost 150 generations of men were necessary for the most important of all revolutions, the food producing revolution.

No person and no area in the New World can be given full credit for having produced the agricultural revolution. We can only say that in Mexico we know the transition from man the hunter to man the farmer to man the "civilized" better than in any other place in the world. That a wide area was participating in the agricultural revolution is particularly evident in Peru, where an apparently independent tradition of agriculture had existed at least 1500 years before the appearance of Mexican corn (about 1000 B.C.).

What was happening in between Peru and Mexico is difficult to say. Wet, tropical conditions have made it impossible to recover early plant remains, but archaeological sites with well made pottery are known from Ecuador and Colombia 1000 years before pottery appeared in either Peru

THE FOOD PRODUCING REVOLUTION

Feeder of Men: Corn

or Mexico. Whether early Indians there were farmers or simply hunters and gatherers exploiting the rich sea shore environment remains to be discovered. Whichever they were, corn did diffuse from Mexico to Peru, and manioc (yucca) and some Peruvian species of beans reached Mexico in return.

The vast complexity and quantity of varieties of corn in Peru can probably be accounted for by modern genetics. Rather than expressing the length of time of isolation in the Andes, the varieties of corn are the result of enforced isolation in small valleys and rapid mutation. It is known that in high altitudes, such as in the valleys in the Andes, intense solar and cosmic radiation generates mutations more rapidly than in lower zones.

Several varieties of distinctly Andean corn were eventually introduced back into Mexico, causing the initial confusion in corn classification and research.

In Mexico, where the climate was dry but water sources sufficient, primitive farmers could advance into new areas without excessive clearing. Rivers and lakes afforded water for irrigation, and a varied environment supplied a spectrum of plants and stimulated trade of goods and ideas. Varieties of corn suited to various climates were developed, and the total productive capacity increased. On this economic basis, one of the great civilizations of the world arose.

Peru underwent a similar process, combining corn with important home crops such as potatoes and manioc (yucca). With such versatile staples the Andean Indians exploited the dry coast, the high mountain valleys, and the wet tropical forest, accumulating one of the most impressive collections of domestic plants in the world.

Domestic animals played a very minor role in the New World. The dog was perhaps brought with early hunters from Asia or perhaps domesticated independently in the Americas. Several varieties existed before the introduction of European dogs, but perhaps most famous is the fat little Mexican dog, the chihuahua, which was raised for food. The meat animal of the Andes was the locally domesticated guinea pig. Aside from these, ducks, turkeys, and bees were domesticated in various parts of the American continents. In the Central Andes the llama and alpaca, American relatives of the camel, were also brought under domestication. Though both, and particularly the llama, were slaughtered and eaten, they were kept primarily for other purposes. The llama is a pack animal, carrying up to 80 lbs. However, it walks faster than the horse or donkey and is very sure footed as well as resistant to high altitudes and cold. Alpacas are fine wool producing animals. Their wool is used for making the warm clothes that the highland Indians need to survive. Though little information is available, llamas and alpacas have probably been herded since 1000 B.C. or earlier. In contrast to New World plants, it appears their first use was not strictly functional but perhaps sacrificial.

THE FOOD PRODUCING REVOLUTION

7. Read the following article and then answer these questions:

a. Approximately when and probably where was the dog first domesticated?

b. What kinds of evidence have been used to ascertain the origin of the domestic dog? List them below.

c. How has domestication by man changed dogs?

THE FOOD PRODUCING REVOLUTION

DOMESTICATION OF THE DOG

Domestication in its simplest terms means "tamed." In our search for the ancestor of the dog, we are asking what animal (or animals) which became the dog was first tamed by man, thereby becoming a domesticate. The suggestion has been made that the domestic dog was derived from a wild dog that is now extinct. This has been rejected by scholars, though, because no fossil evidence of such an extinct dog has been found. Thus we will operate under the basic assumption that this animal which became the domestic dog was one of the living wild members of the same genus, Canis, since, through evidence from early archaeological sites and paleozoological* studies, it has been determined that wolves, coyotes, jackals and foxes have been present in essentially modern forms for over half a million years. Therefore, the comparison of canid remains dating from 50,000 years ago with bones of modern canids is valid.

Thus, the early ancestor of the dog was probably one or more of the following members of the genus Canis: the wolf, the coyote, the jackal, the wild pariah dog, or the wild Australian dingo dog. It is assumed that the dog was first domesticated somewhere within the geographical distribution of these living wild members of the genus Canis. Figure 2.1 is a map of their distribution.

There is fossil evidence which supports the wolf as the ancestor of the dog and which would place the domestication of the dog as very early, indeed. On the basis of careful analysis of bones of wolves and fossil remains of canids from early sites in Denmark called Magelmosian sites, (6500-8000 B.C.), it has been concluded that the Maglemosian dogs of northwestern Europe were wolf-derived. In the opinion of Dr. Charles A. Reed, a paleozoologist, the earliest valid specimens of the domestic dog in the Near East are from one of the lower levels of Jericho (6500 B.C.). The limited sample shows considerable size variation, indicating at least two breeds. On the basis of dental similarities, it has been concluded that the dogs of Jericho are also wolf-derived.

Unfortunately, northwestern Europe and the Near East are the only two areas that have been carefully studied. One cannot rule out the possibility that the dog was domesticated many times in several places. The fossil evidence is overwhelmingly in favor of the wolf as the ancestor of the dog, but this may be due to the bias of archaeological investigations in the domain of the wolf.

There is also cultural evidence for dogs having been around a long time. At Jarmo, an early farming village in Iraqi Kurdistan which dates about 7000 B.C., the best evidence so far for dogs is cultural in nature. Small figurines of very doglike animals with upcurled tails have been uncovered. The domestic dog is the only member of the genus that has a curled tail. Otherwise, the figurines could have been of wolves or foxes. The biological evidence would be misleading without the cultural evidence because the bones of the canids found in Jarmo are

*The comparison and study of bones is called osteology, but when it deals with ancient animal bones, it is called paleozoology (the study of ancient animal life). This field of research is essential for the investigation of domestication of animals, for it is only through careful analysis and comparison of bone remains that one can determine what these early animals were. For instance, if an archaeologist finds the remains of what he thinks is a dog, he may thus call in a paleozoologist to determine whether these are the remains of a dog, a wolf or a jackal.

THE FOOD PRODUCING REVOLUTION

either of foxes or wolves. It has been presumed that wolves and foxes made up part of the diet of the people of Jarmo and this is why their remains are found in the habitation debris. Dogs were evidently not eaten and were disposed of elsewhere? Or were they held in such loathing that their carcasses were not allowed to lie in the village dump? We can never know. It must be pointed out that, with many of the archaeological remains, it is very difficult to distinguish between small wolves, large dogs, and foxes.

One of the few long range behavioral studies of dog breeds is found in John Scott and Paul Fuller's book, Genetic and Social Behavior of the Dog, published in 1965 by the University of Chicago Press. This study is the result of five years of research. The authors support the hypothesis that the wolf was the ancestor of the dog. The comparison of various types of behaviors of the dog, wolf, jackal, fox and coyote show that the wolf and the dog share common behaviors. All of the canids are pack animals; they prefer social living to solitary living. They are hunters and scavengers.

The great variety that is found among the various dog breeds is not found among the wild members of the genus. The hereditary composition of any wild species tends to reach a condition of balance. Traits that do not enable the animal to operate effectively in this environment are lost over time. Ineffective animals simply fail to reproduce. For instance, if a wolf was born with the mutated stumpy legs of a dachshund, he would not reach maturity because he could not catch his prey. The mutation would not be passed on and the characteristic would die out.

Over the centuries, however, man has learned to control the characteristics of his domesticated animals with increasing efficiency. Thus genetic selection was evolved without man's really understanding what biological force was being used--only that it worked. Man bred dogs for gentleness or speed or fierceness. Some breeds of dogs are used just for hunting, whereas other breeds have lost either the acute sight or sense of smell that are valued in the hunting breeds. The Pre-Hispanic Mexicans bred dogs as food animals (the ancestor of the Chihuahua). They were considered a great delicacy.

Sometimes, then, animals which would not be able to survive in the wild stayed alive and bred because man took care of them. For instance, if a desirable "champion purebred" is sickly, he is fed, protected and bred. He will probably pass his sickliness on to his offspring. Man thereby has unwittingly created a physically weak breed. An example of this is the English setter, who commonly has hereditary hemophilia or bleeders disease but is prized as a hunting dog.

Wolves and dogs share the same basic behavior patterns (hunting, scavenging, pack living, etc.). Over the millenia, however, selection for particular traits has modified some of these behaviors in dogs. For instance, the bird dog breeds are unusually peaceable animals; they have been selected for a "soft mouth" so that birds will not be damaged when carried back to the hunters. For the old English sport of bullbaiting, a dog was needed that would attack a grown bull. The bulldog breed was selected for a tendency to attack the muzzle of the bull and hang on instead of attacking from the rear as most dogs and wolves do. Hence the breed has been named the bulldog.

THE FOOD PRODUCING REVOLUTION

We could consider every breed for its particular characteristics, but one last illustration will serve to demonstrate how certain behaviors of various breeds of dogs are related to their physical structure and how these characteristics have been retained and valued. The scent hounds are unusually peaceful animals which rarely get into serious fights. The hounds also have long, baggy lips which could easily be bitten by the hound himself in the course of a fight. These baggy lips, though, probably help him to "taste" the scent he is following.

Probably the dog breed that still most closely resembles its ancestor is the Eskimo sled dog. These dogs are often bred with wolves to maintain their strength and fierceness. The Eskimo dog runs in a pack; he would hunt and kill if allowed to and he fights with the other members of his pack when fed. In short, this breed displays many more behavior systems resembling those of the wolf than other "more domesticated" breeds such as a tiny toy poodle. The toy poodle has been changed over the millennia by the capricious whims of his master, man.

Now that we know that man, through selective breeding, is responsible for the great variety of dogs, we can speculate how this first came about.

There have been recent instances of wolves that were tamed and kept as pets. One such case is told in a Saturday Evening Post story "The Wolves in our Tent" (No. 223, 1956, pp. 34-36, 90-92). The story is about Mr. and Mrs. Crisler, who spent several months in northern Alaska working on films of caribou. They adopted wolf pups and kept them as pets. They state that the wolves were just as affectionate as any domestic dog. As long as the tamed wolves were well fed, they did not hunt or kill other animals.

It is not hard to imagine an early hunter and gatherer finding and keeping a wolf pup 10,000 years ago. The pup probably learned to follow the hunters and take advantage of the remains of a kill. It is even easier to imagine that eventually someone discovered the "tamed wolves" sensitivity to strangers, animals or humans, who were approaching, and so the "tamed wolves" came to be valued as watchdogs.

In the beginning, there must have been some confusion between tame wolves and wild ones, but very early a mutation occurred giving the tamed variety, of all things, a curly tail. Wild and domestic wolves could then be easily distinguished. Also, very early, there probably occurred selection for animals that could be easily controlled. This meant the development of small or medium sized wolves with smaller and less dangerous teeth.

The "new wolf" could have moved into new geographical areas not inhabited by wolves, jackals or coyotes. These "new wolves" would then adapt to the new and different environments, possibly changing somewhat physically in doing so. This is called adaptive radiation. Thus whole new populations or breeds may have come about from a few variable dogs. The new, changed populations of dogs did not have to compete with the wild members of the species and therefore their physical variation from wolves was passed on to future generations.

THE FOOD PRODUCING REVOLUTION

It is quite possible that each early farming village had a small population of dogs somewhat different from those of other villages. Constant inbreeding and the tendency of human beings to select and breed those animals they especially valued for some characteristic gave rise to different kinds of dogs. The history of modern European dogs shows that many breeds were purposefully produced. In Egypt there is evidence (a bowl with recognizable pictures of greyhounds) that greyhounds were bred as early as 3500 B. C.

One of the desired transformations from a wolf to a dog would be a reduction of wildness. If a wolf puppy is taken from its parents before its eyes are open and is adopted into a human society, it will develop very much like a domestic dog. The older the wolf cub gets before it is taken away from its parents, however, the harder it is to domesticate it. It develops fear reactions and fighting behavior very early in its natural habitat. An older cub bites and fights in frantic fear when caught. An adult wolf can be tamed eventually, but it is a long and delicate process.

In conclusion, it is most likely that domestic dogs came about as a result of early man taming a wolf cub 10,000 years ago. During this long, continuous, and close association between man and dogs, the various breeds of dogs have developed. The modern breeds of dogs are, therefore, artifacts of human societies. They are products of selective and controlled breeding.

BIBLIOGRAPHY

- Crisler, Lois. "The Wolves in Our Tent," Saturday Evening Post, No. 228, 1956, pp. 34-35, 90-92.
- Reed, Charles A. "A Review of the Archaeological Evidence on Animal Domestication in the Prehistoric Near East" Prehistoric Investigations in Iraqi Kurdistan, R. J. Braidwood and B. Howe, (Chicago, Illinois: University of Chicago Press, 1960).
- Scott, John Paul and John L. Fuller. Genetic and Social Behavior of the Dog. (Chicago and London: University of Chicago Press, 1965).
- Zuener, Frederick E. "Domestication of Animals" C. Singer, E. J. Holmyard, and A. R. Hali, (Oxford: 1954.) A History of Technology.
- . A History of Domesticated Animals. (New York: Harper and Row, 1963).

THE EMERGENCE OF CIVILIZATION

Part 1 - Introduction and Mesopotamia

THE EMERGENCE OF CIVILIZATION

This section, "The Emergence of Civilization," is designed to help students understand what took place during a very important chapter of man's history--the chapter during which he developed civilizations. Preceding this section we have studied the origin of man and the hunting and gathering way of life of early men. We then considered the revolution in food-getting, food production, and its importance. Without this very important step in man's cultural development, civilizations could not have arisen. Following this section we will consider the development of more and more complex civilizations--in Greece, Rome, and in Europe, from which our American civilization is primarily derived.

The section is organized in the following manner: First, we will study the process of cultural development leading to civilization in Mesopotamia. Then we will formulate a tentative list of criteria for civilization. Third, we will study the Inca civilization in Peru and then trace its development from earlier Peruvian cultures. Then we will compare the process of development which took place in Mesopotamia and Peru and revise our criteria for civilization. We will consider the question: what is civilization, anyway? Fifth, we will consider the question of why civilization developed in Mesopotamia and/or Peru and study some theories regarding this question of why?, ending with the conclusion that why? is not a useful question. It is much more useful to ask: How did civilization develop?

We have chosen to use the two civilizations--in Mesopotamia and Peru--as case studies in our study of this part of man's cultural development. These two civilizations arose independently, i. e., there is no reliable evidence as yet that the development of one influenced the development of the other. The process of cultural development leading to emergence of civilizations may be viewed as comprised of increments of change resulting in better and more effective adaptations. Man, using his cultural traditions, was doing things within and to his environment. He was not striving for civilization. He was merely coping with his immediate problems and the possible solutions for them.

As you progress through this section with your students, try to keep the PROCESS OF CULTURAL DEVELOPMENT in mind and not let yourself or your students become "bogged down" in masses of details. Details are important in that they can be used to point out aspects of the process, but they are not our primary focus in this section. Try to reinforce in this section some of the students' learnings in earlier sections of this unit, particularly with regard to culture change and the interpretation of archaeological data. Also, reinforce and further develop some of the concepts introduced and partially developed in Course I.

The process of development was in many respects similar in both Mesopotamia and Peru, though their rate of development was not the same. The two areas passed through similar stages in their development. Both areas developed fully efficient food production, though the products themselves were different. The increased food supply led to increased specialization and the growth of large population concentrations (cities) in both areas. It is interesting to note that in both Mesopotamia and Peru there are divergent and varied physical environments

THE EMERGENCE OF CIVILIZATION

contingent to one another offering developing societies a broad range of different topographies, climates, vegetations, soils, and animals with which to "accidentally experiment." In both Mesopotamia and Peru, civilization was founded upon a crop (wheat or corn) which demanded social interaction and organization for cultivation, harvesting, and storage.

There are also other parallels between the civilizations which arose in Mesopotamia and in Peru. Both developed elaborate systems of redistributing goods and services. In both regions the cultural development culminated in formal political states with stratified classes. Those states became bound up with formal religions with powerful military machines and the ability to execute extensive public works.

There were some differences in the process of development and in the resultant end products in Mesopotamia and Peru. For instance, the Peruvians seemed to have a temple complex earlier in their development than the Mesopotamians. The particulars of the developmental process and the end products are quite distinct in the two areas. Cuneiform writing was present in Mesopotamia; Peru had the quipu. Mesopotamians used wheels and draft animals; Peruvians did not have the wheel and used humans and llamas to transport goods. The economic base in Mesopotamia consisted of wheat, barley, sheep, goats, pigs, and cattle; in Peru it consisted of corn, potatoes, beans, squash, yucca, peppers, llamas, and alpacas. Settlements were relatively more compact in Mesopotamia than in Peru. It can readily be seen that the civilizations which arose in the two areas are distinctly different. Each is a unique combination of the many and varied factors figuring in its development.

What is civilization, anyway? A number of different lists of criteria have been used to clarify and define the usage of this term. We can say that a certain culture has reached the stage of development we call civilization if the criteria we have listed for civilization are exemplified in this culture. And that is what civilization is: a stage of development. Do other stages lie beyond this? We don't know and can't know. We can't label the present and future situation any better than the Sumerians could.

Your students will be compiling charts which can be used to compare the cultural development in Mesopotamia and in Peru. For the charts to be meaningful, students will have to do some synthesizing. The questions in the student manuals should help with this, but you may need to give some additional assistance. Let your students do the charts as much on their own as possible, however. Note on the chart that the site names are placed opposite the approximate time period during which the site was occupied. The site of Huaca Prieta really represents a somewhat earlier stage in cultural development than Jarmo. Your students should note that there is not a great deal of difference between the various periods on their chart and that the developments seem to flow into each other. This is good. The process of cultural development did not progress by a series of jerks, starts and stops, and discontinuities, but was a gradual, more smoothly-flowing process. The various periods flow into each other and the lines between them are in reality arbitrary (cf. the concept of typology in the Archaeology section). You will want to fill in a chart for your own use.

THE EMERGENCE OF CIVILIZATION

Read this section through--particularly the introduction pages--before you teach it. The Teacher Background pages for the study of Peru can, in the main, be applied equally well to the study of Mesopotamia, and it is strongly suggested that you read them before beginning the study of Mesopotamia.

Remember that in this section we are dealing primarily with:

1. THE PROCESS OF CULTURAL DEVELOPMENT
2. THE NATURE OF "CIVILIZATION"
4. THE UNIQUENESS OF EACH CIVILIZATION

MESOPOTAMIA

Introduction and Teacher Background

BIBLIOGRAPHY FOR MESOPOTAMIA

Adams, Robert M. "The Origin of Cities" reprinted from Scientific American by Freeman and Co., San Francisco, 1960.

This reprint of an article from Scientific American is included in the teachers manual.

*Braidwood, Robert J. The Near East and the Foundations for Civilization (Eugene: Univ. of Oregon Press, 1962), 44 pp. (Address orders to: University of Oregon Books, 107 Friendly Hall, University of Oregon, Eugene, Oregon.)

This book is essential for teachers and it is also suggested as a source book for students. It contains an amply illustrated and comprehensive account of the "Sequence to Civilization in Iraq," written by the principal archaeologist of the area.

*Cottrell, Leonard. Land of Two Rivers (2231 West 110th Street, Cleveland 2, Ohio: World Publishing Co., 1962), 127 pp.

This is an indispensable book for students. It is the story of the beginnings of the first known civilization in Mesopotamia. It is accurate, simply written, and enjoyable reading.

Cottrell, Leonard. The Quest for Sumer (New York: G. P. Putnam Sons, 1965).

Dr. Cottrell reviews in this volume the major archaeological excavations in Mesopotamia. Some of the chapter titles are as follows: "The Archaeologist as Detective," "The Secret of Writings," "The Death Pits of Ur," "Art, Music and Literature" and "Portrait of Sumer." The bibliography is exceptional and it alone would warrant purchasing the book for teacher use.

DeCamp, L. Sprague. Ancient Engineers (Garden City: Doubleday and Co.).

This volume is essential for the development and history of technology. It can be used as a source for reports on temples, types of houses and style of architecture.

Fairservis, Walter A., Jr. Mesopotamia: The Civilization that Arose Out of Clay (New York: Macmillan Co., 1964).

This is a descriptive account of the development of writing in Mesopotamia. It contains many illustrations and is ideal for individual student reports. It also contains a good description of a Sumerian family.

Hawkes, Jacquetta. Prehistory, Vol. I, Anchor Books (Garden City: Doubleday).

This book should be added to your library as an encyclopedia of world prehistory. It is a little difficult to read but provides "readily findable" data on almost every aspect of prehistory.

MESOPOTAMIA

Introduction and Teacher Background

Kramer, Samuel Noah. History Begins at Sumer, Anchor Books (Garden City: Doubleday, 1959).

A series of first in history, the first law case, the first schools, the first farmers almanac, etc., are described in this book. Several of the chapters have been suggested as sources for student reports.

Mellaart, James. The Earliest Civilizations of the Near East (New York: McGraw-Hill Paperbacks, 1965).

This is by far the best book for illustrations and reconstructions of temples, cities, and houses.

Mumford, Lewis. The City in History (New York: Harcourt, Brace and World, Inc., 1961).

One of the most important developments which accompanied the emergence of civilization was the rise of cities. This would be a good reference book for teachers on such topics as the nature of the city and the nature and origins of the earliest cities known.

ADDITIONAL REFERENCES

Burns, Edward M. Western Civilizations (New York: W. W. Norton and Co., Inc., 1947).

Childe, V. Gordon. New Light on the Most Ancient East (New York: Grove Press, 1957).

Childe, V. Gordon. What Happened in History (Baltimore: Penguin Books, 1954).

Chiera, Edward. They Wrote on Clay, Phoenix Books (Chicago: University of Chicago Press, 1938).

Cottrell, Leonard. The Anvil of Civilization (New York: Mentor Books, 1957).

Fairservis, Walter A., Jr. The Origins of Oriental Civilization.

Frankfort, Henri. The Birth of Civilization in the Near East, Anchor Books (New York: Doubleday).

Frankfort, Henri. Before Philosophy (Baltimore: Penguin Books, 1959).

Kramer, Samuel N. The Sumerians (Chicago: University of Chicago Press, 1963).

MESOPOTAMIA

Introduction and Teacher Background

Linton, Ralph. The Tree of Culture (New York: Vintage Books, 1955). Chapter 5, "Earliest Civilizations."

Parrot, Andre. Sumer (Thames and Hudson, 1960). Contains many excellent illustrations of Mesopotamian art.

ADDITIONAL AUDIO-VISUAL DATA USED

(MESOPOTAMIA)

SLIDES

111 - (M4)

and

112 - (M5) The ziggurat of Ur, site and reconstruction. Third dynasty. A religious monument, the ziggurat is a sort of giant pedestal, arranged to permit the divinity to descend to earth.

TAPES

A Temple Excavation in Mesopotamia. A Slide-Tape Presentation. (166 slides, 45 min. in length)

In this slide-tape presentation is depicted the growth and development of the Inanna Temple at Nippur. This temple was begun during the Proto-Literate Period and expanded many times. The slides show its growth from a small house-like structure to the imposing monumental complex of the Third Dynasty of Ur. There are also excellent slides of cuneiform tablets, in situ, the ziggurat of Ur with the temple on top, tools, utensils, ornaments and pottery. You will have to put slides through very quickly to keep up with the tape. It would be advisable to practice doing this at least once before class. Make sure all the slides are in order before you begin.

This presentation is so absorbing that your students may be "mesmerized" at the end of it. Allow them a little time to adjust to the classroom situation again. Having them aware of certain questions before they have the presentation may help to alleviate this "mesmerization." Also, having them answer these questions on paper before the questions are discussed in class may help.

The following questions may prove useful:

- a. What kinds of archaeological data are there to tell us about the temple?
- b. How would the concepts of stratification and association be important in describing and analyzing this site?
- c. What do these various buildings indicate about the cultures of the builders? What knowledge, skills, etc., must be present in the cultures in order that buildings like these may be built?

MESOPOTAMIA

Introduction and Teacher Background

The presentation may be used at almost any point during the consideration of cultural development in Mesopotamia. It is recommended, though, that it be used while you are considering one of the later periods of development.

The tape and slides may be purchased from the Anthropology Curriculum Study Project, 5632 Kimbark Avenue, Chicago, Illinois 60637.

Epic of Gilgamesh, the Flood.

There is a great deal of data about the culture of Early Dynastic Mesopotamia which may be gleaned from this tape. Note the similarity of the story of the flood to the Noah story in the Bible.

TRANSPARENCIES

- Tr. 117 Population Distribution: U. S. 1960 (Includes loci of World's Oldest Civilizations)
- Tr. 118 Landform Distribution: World
- Tr. 123 Vegetation Distribution: World
- Tr. 124 Soil Distribution: World
- Tr. 103 Middle East (Sumer and Jarmo)
- Tr. 103.1 Middle East--Climate

PICTURES

Check the books listed on your bibliography for useful pictures. The Emergence of Civilization, for instance, has some good illustrations and James Mellart's The Earliest Civilizations in the Near East has excellent illustrations and reconstructions.

ADDITIONAL ACTIVITIES

It is very strongly recommended that you obtain reproductions of Mesopotamian artifacts. They will add an otherwise unobtainable dimension to our consideration of cultural development in Mesopotamia. Your students can handle and examine the artifacts.

T-8

MESOPOTAMIA

Introduction and Teacher Background

REPRODUCTIONS FROM THE UNIVERSITY MUSEUM

Address orders to: Sales Department
The University Museum
33rd and Spruce Street
Philadelphia, Pa. 19104

All orders must be prepaid and if you prefer parcel post there is an additional charge. Allow at least 30 days for delivery.

Items recommended

Order No.	Description	Price
0423	A 4,000 year-old commercial tablet which records a business deal made by two parties. It is from Karish in Turkey and is complete with its envelope. Putty colored tablet 2 1/2 x 1 3/4 inches Envelope 3 x 2 1/2 inches Parcel Post	2.00 2.50 1.00
0411	Known as the Pictograph Tablet this is one of the oldest records of writing, about 2300 B.C. The original was written not long after writing had been invented. Black, 2 3/4 in. sq. Parcel Post	2.00 .50
0432	Cylinder seal from Ur, 2400 B.C., shown Gilgamesh in combat with a lion. It is advisable to buy the impression also. Seal: green and white 1 1/2 in. high Impression: white - 2 inches high Parcel Post	2.50 1.50 1.00

MESOPOTAMIA

TEACHER BACKGROUND

Read the books The Near East and the Foundations for Civilization and The Land of Two Rivers and the article "The Origin of Cities" by Robert M. Adams (a Scientific American reprint) before you begin to teach about Mesopotamia. These will furnish necessary background material. Students are urged to read The Land of Two Rivers, also.

Civilization did not emerge in Mesopotamia in a day. It took several thousands of years to develop. There were a number of different stages in this development. In Mesopotamia, these stages are sometimes called the Village Farmers, the Ubaid period, the Proto-Literate period, the Early Dynastic period, and Sumerian civilization. Usually, it is considered that the level of civilization was reached when the city-states that were characteristic of the Early Dynastic period were merged into one kingdom, Sumer. We will use the name "Sumer" to refer to this civilization but not to all the stages of development which preceded it. The name "Mesopotamia" refers to the geographical region in which this cultural development took place.

The emergence of civilization in Mesopotamia has special interest since the people of this area were the first to apply the ideas and techniques of the Agricultural Revolution, and, we find here the earliest examples of writing and of cities. Also, much of the physical evidence of settlement of this civilization has been buried.

For the high school student these may not seem to be facts of special interest. But he is interested in origins--the first automobile, as well as the latest model; the first airplane as well as the newest. The first cities may hold as much excitement for him as the one he now lives in or visits during the summer. A World's Fair in New York is believable. A world's fair in a thatched roof village is more difficult to imagine. Cities and civilization seem to be coexistent. Since students are interested in origins and also in values, they may be intrigued by trying to find out how urban civilization grew. The archaeological record is lean and sparse. It will appeal to the Sherlock Holmes in your class who values evidence for its own sake, who may appreciate the past simply because it reveals the past. Others will need frequent analogies with the present and with things within their frame of reference.

As we have said, each civilization which developed was unique in certain respects. The consequences of the peculiar aspects of Sumerian civilization are many. Sumer has taken Egypt's place as the earliest civilization. We should not infer from this, as was often the case with Egypt, that because it was the first it was also the "cradle" of all later civilizations. Indeed, it is important that in a study of emerging civilizations students come to understand that all later civilizations were not a result either of the diffusion of ideas or of people from any one source.

The presence of writing in Sumer is helpful in two ways. As history, it supplements the findings of the archaeologist; but writing also makes it possible for us to draw more plausible inferences about the social and economic and religious life of a culture in the centuries prior to the development of writing. The dry, hot climate of Mesopotamia has favored the archaeologist. The ruins

MESOPOTAMIA

Introduction and Teacher Background

of past villages, towns and cities, although buried, are well-preserved and we can trace the origins of the walled city of 50,000 inhabitants back to the walled town of 4,000 back to the hilltop village of 150. We cannot know of their religious beliefs before the advent of writing but we can see the evolution of architecture, principally temples, from insignificant structures 10 inches x 10 feet in 4600 B.C. to imposing buildings comparable in magnificence (but not function) to the pyramids of Egypt or the cathedrals of the Middle Ages.

Cultural development in the Mesopotamian plain took place between the Tigris and Euphrates Rivers. A calm water-way, the Euphrates was barely navigable because of the sand bars at the southern end and cataracts in the northern portion. The Tigris, however, flowed rapidly and provided a highway for commerce. During the rainy season, the rivers flooded, bringing vast quantities of rich soil into the adjacent fields. A destructive element accompanied the beneficial one; the flood waters converted the mudbrick buildings of the region to formless mounds.

One student has described the importance of the physical environment of Mesopotamia in the cultural development there as follows:

One of the most important conditions of the river valley was the water itself. This provided the human beings with their basic need for water. Not only did the river supply this, but also fertile alluvial and delta soil, due to floods. There were many plants and animals available to the people of this area, also, because all living things need water.

The climate was good for growing things, because of plenty of sunshine, and the alluvial plain supplied a good place to build permanent housing.

Yet, even though there were many favorable conditions, there was also challenge. The many favorable conditions supplied man with enough time and energy to speculate about these problems. An entirely barren area, with very few favorable conditions doesn't supply man with enough time or energy, and a place with no problems does not stimulate either. A tired or a satisfied man does not speculate. But around this river valley the balance of favorable and unfavorable conditions caused this thought.

The Sumerians occupied the lower portion of the Mesopotamian valley. These agricultural people learned to control the floods through irrigation and to construct strong-walled urban areas, such as Ur and Lagash. The architecture of the Sumerians reflected their beliefs as well as their natural surroundings. Life on earth was the central concern of these people in Sumer. Their major buildings were temples and palaces and not tombs. Nature gods were important in their religious beliefs, and therefore influenced the design of the temples. The gods were often represented as having human form, and it was considered possible for them to descend to earth for direct interaction with man. This belief may well explain the series of stairs leading from the summit of the temples to the ground. Sumerian interest in life was further shown in their

MESOPOTAMIA

Introduction and Teacher Background

sculpture in which various animals and plants dominated the scenes of seals and stele. Building materials were scarce in Sumer and this prevented extensive development of sculpture and permanent monumental architecture. Sun-dried brick construction was most common for large quantities of stone were not available. The use of copper and of such stones as diorite and lapis lazuli in sculpturing indicated long distance trade with other cultures since these stones and metal were not to be found in Mesopotamia.

There are some particularly interesting aspects of Mesopotamian civilization which you will want to discuss with your students. The invention of writing and the changes it wrought is one of these.

The invention of writing is a fascinating and complex story: (See artifacts-- pictographic tablets, cuneiform tablet and envelope, cylinder seals.) The earliest evidence of writing indicates religious and economic uses for the first symbols-- lists of kings as well as details of commercial transactions and of commodities delivered from or supplied to the temple.

To discover the impact of writing upon man's society the class could be asked to imagine a society without writing. Would the children attend school? What would be this imaginary society's equivalent to the public library? What purposes do the public school and the public library fill in our culture? (Socialization) The revolution involved in the discovery of writing may then be seen to have as great an effect as the Agricultural Revolution itself. With domestication of plants and animals man gained a surer food supply and with this longer life, greater security, a more abundant population, and eventually, greater leisure; with the advent of writing man was able to store ideas as well as grain for future use.

Another interesting aspect of Mesopotamian culture is the development of mathematics. In what ways is mathematics a useful tool? Why would it be an advantage to the temple-priest or city-king to know the exact extent or area of land tilled by the various individuals in the city or on the estate? (It could be used as a basis for taxation or as a basis for estimating the amount of grain which might be harvested. If the leaders could measure accurately the amount of grain stored in one bin they could compute how long it might last in time of drought or flood and upon this basis decide how large a ration could be allotted to each family.) Also, the flooding of the rivers would tend to disrupt, cover over, or wipe out boundary markers between fields. After the rivers had gone down, it would be necessary to re-compute where the boundaries belonged. Mathematics would be extremely useful in this. In fact, geometry developed to a fairly high level in Egypt due to the necessity of re-computing boundaries after the flooding of the Nile.

The economic base of Sumerian civilization remained an efficient agricultural system. The student might compare this situation with what he thinks is the basis for civilization in the United States today. We are the heirs of the Industrial Revolution as well as the Agricultural Revolution. Factories dominate our cities and the American urban resident of 1965 is far more divorced from the land than was his counterpart in Ur or Lagash in 2400 B.C. Perhaps some students will recognize that our own society's prosperity is based upon an abundance of natural

MESOPOTAMIA

Introduction and Teacher Background

resources--mineral as well as agricultural, a literate labor force, an advanced technology, a large stock of capital equipment, an efficient system of transportation and communication, a banking system, and a stable government. If students can perceive that the economic institutions influence the development and "personality" of civilization, they should begin to see that the term "civilization"--although we speak of it as though it was composed of only a certain number of specific ingredients--is in fact a way of living which has much variety of form.

In the study of civilization in Mesopotamia, you will want to make sure that your students understand some of the features which characterize Sumerian civilization. Note particularly the following: trade, river valley life, use of the plow and draft animals, specialization (the estates), the role of gods and the temple, mathematics, irrigation systems, use of metal, and the growth of population and urban areas. Be sure to discuss the importance of surplus food and of improved technology and capital equipment.

MESOPOTAMIA

RECOMMENDED TIME TO SPEND WITH THIS PART OF SECTION V: 9 days

1. Use Tr. 117, *The Loci of the World's Civilizations*,¹ to introduce your students to the locations of the earliest civilizations.

87

Put the world map part of the transparency on the screen. Ask the students where they think civilizations might have developed and the reasons for their speculations. This would be a good opportunity to draw information from them that would enable you to assess their knowledge of early civilizations.

Now flip on the overlay showing the locations of the early civilizations. Have the students answer the questions on the *Loci of the World's Oldest Civilizations* in their manuals. Most of the questions require only short answers, but you may want to discuss Question b. with the students, drawing out their ideas and/or observations. Then ask them if there are any other observations that can be made.

Mesopotamia and Peru have solid blue circles only to indicate that they are the loci we are considering in this course. The circle with the blue center for Mesoamerica and the solid blue circle for the Andes suggests that both centers were developing towards the civilizational level by 500 B. C.; it also suggests that either may have stimulated the other, or that both centers may have developed towards civilization independently.

The solid blue circle for the Near East suggests that Mesopotamia had reached the civilizational level by 3500 B. C.; it also suggests that the Egyptian and Indus Valley civilizations appeared slightly later and that they were at least in part stimulated by Mesopotamian civilization.

The circle with the blue center for the Far East suggests the positive appearance of the civilizational level in the Yellow River basin by at least 1500 B. C., and that it may have been stimulated in part by influences from the south and/or the west. The position of a postulated "nuclear" center in south China is indicated by a circle with a question mark. "Nuclear" centers may also have been present in the lower Ganges valley and in Malaya.

It is very important that you stress the fact that this transparency is based on what we know today. Indeed, in the future, the postulated areas may be proven definitely to be ancient centers of civilizations. But we must wait for further archaeological research.

A student might ask why there isn't a postulated center in Africa. After all, that's where the earliest evidence of "man" has been found. The answer is that we just don't know enough as of yet.

1. Braidwood, Robert J. *The Near East and the Foundations for Civilization*, Condon Lectures (Eugene, Oregon: University of Oregon Press, 1962), p. 3. Used with permission of the University of Oregon Press.

MESOPOTAMIA

Now flip on the other two overlays and ask for observations. One observation that the students may make is that there are areas of dense population today that were not original centers of civilization. (Through breeding domesticates, man developed improved, hardier varieties of plants and animals that could survive in colder climates. Also, with the development of iron tools, man could better plow the soil and chop down forests to clear the land for farming, as was done in Western Europe.) Also, though Mesopotamia was an early center of civilization, it is not heavily populated today. (This is perhaps due to an environmental change partially resulting from man; namely, an increase in the salinity of the soil in the Mesopotamian area, making this soil less productive.) Many of the early centers of civilization are located in areas that today are considered "backward," not very technically advanced. Why? (Perhaps man has "worn out" the resources, particularly the soil, in these areas.)

THE NATURAL ENVIRONMENT OF MESOPOTAMIA

- 91 2. The natural environment of the region of the Middle East, which was known at one time as Mesopotamia, is dominated by three physical features:
1. The Tigris and the Euphrates Rivers which flow into the Persian Gulf,
 2. The Zagros Mountains,
 3. The alluvial delta between the Tigris and the Euphrates Rivers.

These features have been the "natural base," so to speak, from which the complex whole which we call civilization has arisen. We cannot stress enough that the environment did not cause civilization to emerge. The natural environment is but one of the many factors involved in the development of cultures and civilizations. The major task of this part of the course is to make the student aware of some of the factors involved in the process of civilizational development. The geography and natural environment of any area in which a civilization developed is certainly one important factor, so let us begin our investigation of the development of Mesopotamian culture with a consideration of:

The Geography of Mesopotamia

Transparencies

The section on the physical environment of Mesopotamia may take one or one-and-a-half periods. You will work with the transparencies (Tr) numbered 118, 123, 124, 103 and 103.1. There are also three readings in the student manual and a map of Mesopotamia.

Tr. 118, 123 and 124 depict elements of physical environment on a world projection. We are concerned with a very small region of the

MESOPOTAMIA

Middle East, so to emphasize this area, it is advised that you cut a 3/4 inch square hole in a plain piece of white paper and place this over the area of interest. This will focus attention on the desired area and block out the rest of the map.

- a. Start with Tr. 103--The Middle East, so students see precisely what area of the world we are interested in. First, show the base outline map and drainage pattern, then ask the students what they can say about the:

Landforms and Drainage Patterns of this area. Have the students write their responses in the space provided in their manuals. (You may also wish to use the world arrangement of landforms Tr. 118 focusing on the Middle East with the windowed box.)

Important points that should be brought out:

- (1) The landforms are primarily mountains (Tr. 118) and hills.
- (2) The main mountain range is the Zagros Range (Tr. 103), running parallel to the Tigris and the Euphrates Rivers. These parallel hills and mountains are separated by wide valleys. One finds few outstanding peaks in the Zagros Range: the highest peaks are only 13,000 to 15,000 feet.
- (3) From Tr. 103 it can be determined that the area is drained primarily by the Tigris and Euphrates Rivers. Several smaller streams drain the Zagros Range, also. The two major rivers and the smaller streams all drain into the Persian Gulf (which is not named on the transparency).

- b. Have your students read "Land of the Tigris and Euphrates." Reading The students are to list the major characteristics of the two rivers in the space provided in their manuals. Ask your students if they think the presence of these rivers was important in the development of civilization. How?

- c. Climates

Project Tr. 103. 1--"Climates of the Middle East." It can be readily seen that the region has three major climatic zones.

- (1) In the mountain region, Mediterranean climate prevails.
- (2) Dry steppe climate occurs in the region bordering a good part of the Persian Gulf and along the courses of Tigris-Euphrates.
- (3) Dry desert is the other major climatic zone.

Reading After your students have discussed the major climatic zones, have them read the reading, "Climate" (of the lowlands) and answer the questions in their manuals.

MESOPOTAMIA

We will refer to Fig. 65 in our discussion of Jarmo. This early farming village in northern Iraq lies in the region which can be cultivated without irrigation, since it receives more than 15 inches of rainfall annually.

You might wish to discuss the correlation of rainfall and settlement shown on the map. It would be good exercise in interpretation of maps, also. The information will be helpful later in the examination of the early farming village of Jarmo.

d. Vegetation

Ask your students what types of vegetation they would expect in the region. After a brief discussion, turn to the vegetation map, Tr. 123. Use the white piece of paper with the 3/4 inch hole to focus on the Middle East.

Just as there are three major climatic zones, there are three major types of vegetation corresponding to the climates. Have your students name them. They are the following:

- (1) The desert shrub and waste found to the south and west of the Tigris-Euphrates (dry desert),
- (2) The middle latitude grasslands along the courses of the rivers. (dry steppe climate), and
- (3) The mixed broadleaf and coniferous forests in the region of the Zagros Mountains (Mediterranean climate).

e. Soils

Project Tr. 124 and focus on the Middle East. Landforms, drainage, climate and vegetation are all important factors in soil formation. Your students should remember many of the following points from previous studies in Man's Physical Environment (Course II - Unit I).

- (1) The dry steppes and grasslands are closely associated with desertic soils.
- (2) These soils are easily worked agriculturally but they usually require some form of irrigation.
- (3) Another type of soil present is the alluvial soil of the delta region between the Tigris and the Euphrates. Your students should recall that alluvial soils are related to areas of the world where sediment has deposited on the banks of overflowing streams and in delta areas. As a whole, alluvial soils are easily cultivated and very rich; however, if they are not properly drained, they are not productive.
- (4) In the mountains to the north are some chernozemic-desertic soils.

MESOPOTAMIA

98

3. Ask your students what they think an early farming village in Mesopotamia might have been like. What would have been some of the important activities in the life of the people? Have them try to put themselves in the place of an early farmer in Mesopotamia and describe as much about "their" culture as they can. Discuss these ideas in class.

Do they think that some of these characteristics might have been present in early farming villages all over the world? Why or why not? If so, which ones?

Transparency

Before you discuss the reading on Jarmo, project transparency 103--The Middle East--and ask your students to check the location of Jarmo. What landforms, drainage, climate, and vegetation would be found there? Bring out the following things:

Landforms--hills and mountains

Drainage--The site is on an old river course draining into the Tigris.

Climate--Mediterranean. (Ask the students to refer to fig. 65 on page 132, and ask them where Jarmo lies in relation to the rainfall distribution.) Jarmo receives more than 15 inches of rainfall annually.

Vegetation--either grasslands or coniferous forest. Now use the overlay for wild grasses and wheat (Tr. 142) and ask the following questions:

- (1) Where is large grained wild wheat found?
- (2) Where is small grained wild wheat found?
- (3) Of the two wild wheats, which has the larger distribution?
- (4) What is the landform of the area in which wild wheat is found? Plains, mountains, the desert?
- (5) Where is wild barley found?

Refer your students to the article on wheat in the Food Producing Revolution section for further information on the plants and animals available to the people of Jarmo.

Ask your students to think about some of the relationships between the residents and culture of Jarmo and the physical environment in which Jarmo is situated. You may want to review with them some of the ideas discussed in "The Nature of Culture" section.

Have your students read the article "Jarmo: An Early Farming Village (7000-6500 B.C.)." The reading is designed to reinforce the previous work on the Food Producing Revolution as well as present the evidence for the earliest known farming village in the world. The reading should point out examples of both economic changes and possible new social patterns, such as:

- (1) more trade,
- (2) people living in larger communities,

MESOPOTAMIA

- (3) surplus of food supply,
- (4) craft specialists,
- (5) people becoming more dependent upon one another,
- (6) development of religion.

Assign the questions with the article. Discuss these questions with your students. As you are discussing them, have your students check the inferences they made earlier.

With regard to question d., help your students understand that stone implements are not sufficient to break up hard sod or other difficult soils. The farmers of Jarmo must have worked small plots that didn't have trees or brush to clear or hard sod to break up. This situation may be compared to the situation on the western prairies in our country. The prairies were grazing rather than farming areas until iron plows came into common use. Be sure that in talking about the resources available to the people of Jarmo that your students realize that the "Jarmo-ites" traded for the obsidian of Lake Van and the shells of the Persian Gulf. There were only four plants and animals that we can definitely say were present in Jarmo (question e.): wheat, barley, goats, and dogs.

Ask your students if they can make any inferences about Jarmo society. See the suggestions listed above. Remember the limitations of archaeological data. To help the students think about the innovations and new social patterns you might have a group role-play some of the activities of Jarmo.

- (1) A farmer with an unusually large grain surplus but who has broken his obsidian sickle.
- (2) A man in the village who chips very fine tools.
- (3) A man who periodically goes to Lake Van to trade grain for obsidian.
- (4) A boy who is being taught farming techniques by his father.
- (5) A woman who has discovered how to make a lighter tastier bread.
- (6) Another woman who makes the best pottery in the village.

4. The chart on The Development of Civilization is to be used to "see" the processes of development occurring in the emergence of two civilizations in different parts of the world--in Mesopotamia and Peru. Note the time difference between the emergence of the two civilizations.

104

Have your students fill in the Village Farmers section of the chart using their data on Jarmo.

Your students should fill in the chart as they finish each period. If they want more space for each period, they may use the back of the chart, though the idea in filling in the chart is to use summary phrases, so additional space may not be necessary.

MESOPOTAMIA

They may want to develop an outline of categories which they may use in filling in the chart for each period. It might be a good idea to work out at least part of this outline in class. Be sure to include a copy of this outline with the materials you return to SSCSC.

- 104 5. Have your students read the summary article, "The Ubaid Period." Note the locations of Hassuna and Ubaid. The culture characteristic of this period was spread over a wide territory. Have your students list the cultural advances (over the level of development represented by Jarmo) made during this period. They may then transfer this information to their charts. They can "test out" the categories on their charts and ascertain whether they need to make revisions in their categories. Add these revisions to the list of categories to be sent to SSCSC.

Some time during this period, there was a shift of development from the northern hills to the plains. Review with your students the characteristics of the physical environment of the Tigris and Euphrates basins. Note especially the soil and the rainfall pattern. It has been found helpful at this point to ask students to list the resources which were available, first, to the people living in the hills in northern Mesopotamia, and, then, to the people living in the Tigris-Euphrates basin. You may want to list these on the board.

Ask your students what they think would have been some of the advantages and disadvantages of river valley life. What changes, then, do your students think will come in the way of life of the Mesopotamians as a result of this move to the river valley. In other words, what do they think the next period of development will be like?

- 107 6. Have your students read the article on the Proto-Literate period in class and check their inferences.

After the migration into the alluvial plain, cultural development accelerated: communal irrigation systems developed; copper became very common; clay farming implements were invented; large temples were built; and the concern of religion shifted from the fertility goddess to water. You will want to read "The Proto-Literate Phase" in The Near East and the Foundations for Civilization, pp. 38-40.

- 108 7. Ask your students to prepare for class discussion the questions listed. Every student should prepare every question. They may prepare the questions overnight.

Divide your class into five groups. Appoint a chairman and a recorder for each group. Have each group consider one question carefully. Allow 15 to 20 minutes for group work. The group

MESOPOTAMIA

chairmen may give reports on their group's thinking during the remainder of the period.

At this time you might ask your students whether some of the generalizations they made about cultures are being illustrated by this data. Certainly they will realize that a change in one aspect of a culture leads to other changes in that culture.

Artifacts

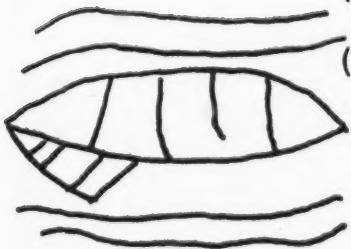
After your students have reported on question d., you may want to show them the Cylinder seal, the Pictographic tablet, and the clay Commercial tablet and envelope. Let the students handle and look closely at the artifacts. Tell them the approximate dates of the artifacts and make sure they understand that the writing on them indicates a progressive development extending into later periods of Mesopotamian development.

Beginning with the Cylinder seal (2400 B. C.), you might ask some of the following questions:

- (1) What is represented on this seal?
- (2) What might this scene tell us about the culture of the people who made it?
- (3) Do we use this principle of impressions for anything in our culture? (cookies, fabric design, etc.)

The following questions may be asked about the Pictographic tablet of Southern Iraq (2300 B. C.):

- (1) What does this tablet represent?
- (2) What does it tell us about the people who made it?
- (3) Does this tablet suggest a level of achievement in the culture?
- (4) What might this level of achievement imply or suggest about other aspects of this culture?
- (5) Pointing to a specific pictograph on the tablet, the teacher might draw this on the blackboard. What might this figure represent? Does this suggest that the people used fish as food, and, if so what does this tell us about the culture? (i. e., occupational specialization; resources used in fishing, dependence on the sea for food)
- (6) What material was used to make this tablet? What might we infer about the soil? The climate of the region?



The CLAY TABLET AND CLAY ENVELOPE should enable students to make additional inferences about the culture and to begin to see evidences of advancement in the culture. Allow time for students to examine carefully and to handle the CLAY TABLET AND CLAY ENVELOPE (1680 B. C.) and then provide time for them to respond to these questions:

- (1) How is this tablet similar to the PICTOGRAPHIC TABLET?

MESOPOTAMIA

- (2) How are they different?
(Note to Teacher: One major difference students should identify is in the style of writing, i. e., the development of a script.)
- (3) What does the development of a script suggest about the culture?
- (4) Who might have written this tablet? Why?
- (5) Does the fact that this tablet is enclosed in an envelope suggest anything about the culture of these people?
- (6) There are markings on the envelope. What might these be? What do these suggest about the culture or way of life of these people?

Question e. provides a good lead-in to the "Epic of Gilgamesh," so you may want your students to report on it and discuss it last. During the discussion of Mesopotamian religion ask your students what they think a ziggurat was like. Then show them slides M4 and M5, The Ziggurat of Ur, Site and Reconstruction. Ask them what inferences might be made about the culture at the time this was built.

Slides

Have your students fill in the Proto-Literate Period on their charts.

110

8. Play the tape "Epic of Gilgamesh" for your students. This story is very similar to the story of Noah found in the Bible. You will want to listen to the tape before class, listing all the different goods and services mentioned. There was a great deal of agricultural and economic specialization in the valley at this time.

Tape

Make sure your students understand the importance of the threat of flooding in Mesopotamian religion. They may want to check what they wrote on question 7b. There is a great deal of data which your students can draw on in filling out their charts from the Early Dynastic Period.

114

9. Ask your students to read the article "Early Dynastic Period" and prepare the questions following the article. You will definitely want to discuss question e. in class. List the changes on the board. Be sure to send a copy of this list to SSCSC.

Some of the changes which have been listed in answer to question e. in the past are the following:

- (1) interaction of people with exchange of ideas
- (2) the exchange of goods (trade)
- (3) increased specialization
- (4) writing, contracts, and laws of record keeping
- (5) the expansion of government--personnel and activities
- (6) more luxury items
- (7) development of mathematics
- (8) better agricultural technology
- (9) transportation methods
- (10) additional defenses
- (11) class distinctions
- (12) an extended religion
- (13) mobility of people

MESOPOTAMIA

Have the students fill in the Early Dynastic Period on their charts.

We will end our study of cultural development in Mesopotamia with this epoc.

Third Dynasty of Ur - 2127 B.C. - 2006 B.C.

- (1) Ur was the center of power. The deified kings ruled and administered from Ur to the unified empire, which included all of Mesopotamia.
- (2) Social classes are distinguishable. The rich and the poor are on the far social extremes with government workers and merchants in the middle.
- (3) The king compiled laws and state judges presided over the court and made decisions. (See History Begins at Sumer, "The First Trial for Murder.")
- (4) Temples become very elaborate in this period.
- (5) Trade was very extensive.
- (6) The calendar was reformed and a uniform system of grain measures was instituted.

Have your students read the article "Sumer: The Third Dynasty of Ur." You may want to designate one class period as a reading period. The students may then answer the questions in their manuals regarding Sumer. You may want to divide them into groups to discuss the questions. Pay special attention to how the students have obtained their information; a great many inferences can be made about Sumer from the laws, proverbs, etc., which have been recovered. How, then, does the culture typical of Sumer at this time differ from Mesopotamian culture during the Early Dynastic period?

If you think your students might be interested in reading about the advice of a Sumerian father to his young son, have them read "The First Case of Juvenile Delinquency" in History Begins at Sumer (also in Source Readings in Ancient History, Ed. by Louis Cohn-Haft). Do their parents ever talk like this?

10. Ask your students to finish filling in their charts. Discuss the charts with them, asking them to summarize the changes which took place. What were the developments in each period leading to these changes? For instance, as population grew, how did the government, settlement pattern, economy, etc., change? The following list may give you some suggestions of different categories of things to look for: type of settlement, physical environment, agriculture, industries, architecture, transportation, trade, social divisions, intellectual activity, warfare, etc.
11. Ask your students to make a list of the criteria that they think would define civilizations. What must a civilization have or be like to be called a civilization? Ask them to insert the lists in their manuals.

MESOPOTAMIA

By the way, there have been a number of different lists of criteria for civilization compiled. Childe's is perhaps the best known of these lists, but there are others. Robert McC. Adams, for instance, has compiled a list of core trends which he has used in comparing the rise of urban centers in Mesopotamia and Middle America. Note the following quote:

Note, also, the list at the end of "The Central Andes" by Donald Collier in your teacher manual.

12. Have your students write essays 300 to 500 words in length explaining how the Mesopotamian civilization developed and some of the important factors in its development. The students will be forming tentative hypotheses about the rise of civilization. Emphasize that their essays are to be the result of their own thinking. It will be interesting to note what framework the students choose to organize their answers. In years past, students have used the listing of cultural universals, the communication/environment/tradition framework described in the Nature of Culture section, or the Social, Economic, and Political framework from the First Course.

Several students may read their essays aloud and you can use them as a basis for class discussion on the topic. Be sure to send the best of these essays to SSCSC.

13. Your students might be interested in knowing what happened to Sumerian civilization. Several students might want to do extra reading and give a report on the reasons for the decline of Sumerian civilization. This is, briefly, what happened:

The Fall of Ur

The central Sumerian government lost control and the Eastern provinces declared their independence. The Western tribes plundered the Sumerian city-states. In 2006 Ur was defeated and sacked by forces from Persia (Iran). Persian rulers ruled over the region until they were expelled from Mesopotamia in 1894 B.C. and the 1st Dynasty of Babylon emerged.

MESOPOTAMIA

1. Looking around us today, we see enormous buildings filled with people busy at a wide variety of tasks. We know that there exist cities containing millions of people. We can eat fruit or vegetables that were growing two thousand miles away the day before. We can talk to people on the other side of the globe and we can send rockets to the moon.

All in all, we live in a pretty complex culture. How did all this complexity come about?

We have seen that early man hunted and gathered his food. He made tools that were very simple by our standards. His communication extended only to members of his band or to persons in several other bands. He often ranged widely over a given territory, but he could go no farther or faster than his legs would take him.

Then came the Food Producing Revolution. Man had learned how to domesticate plants and animals. It became easier for him to get the food he needed. He didn't have to travel around so much. With some time released from the search for food, man could develop better tools and shelters. He could think about religion and art and he could progress.

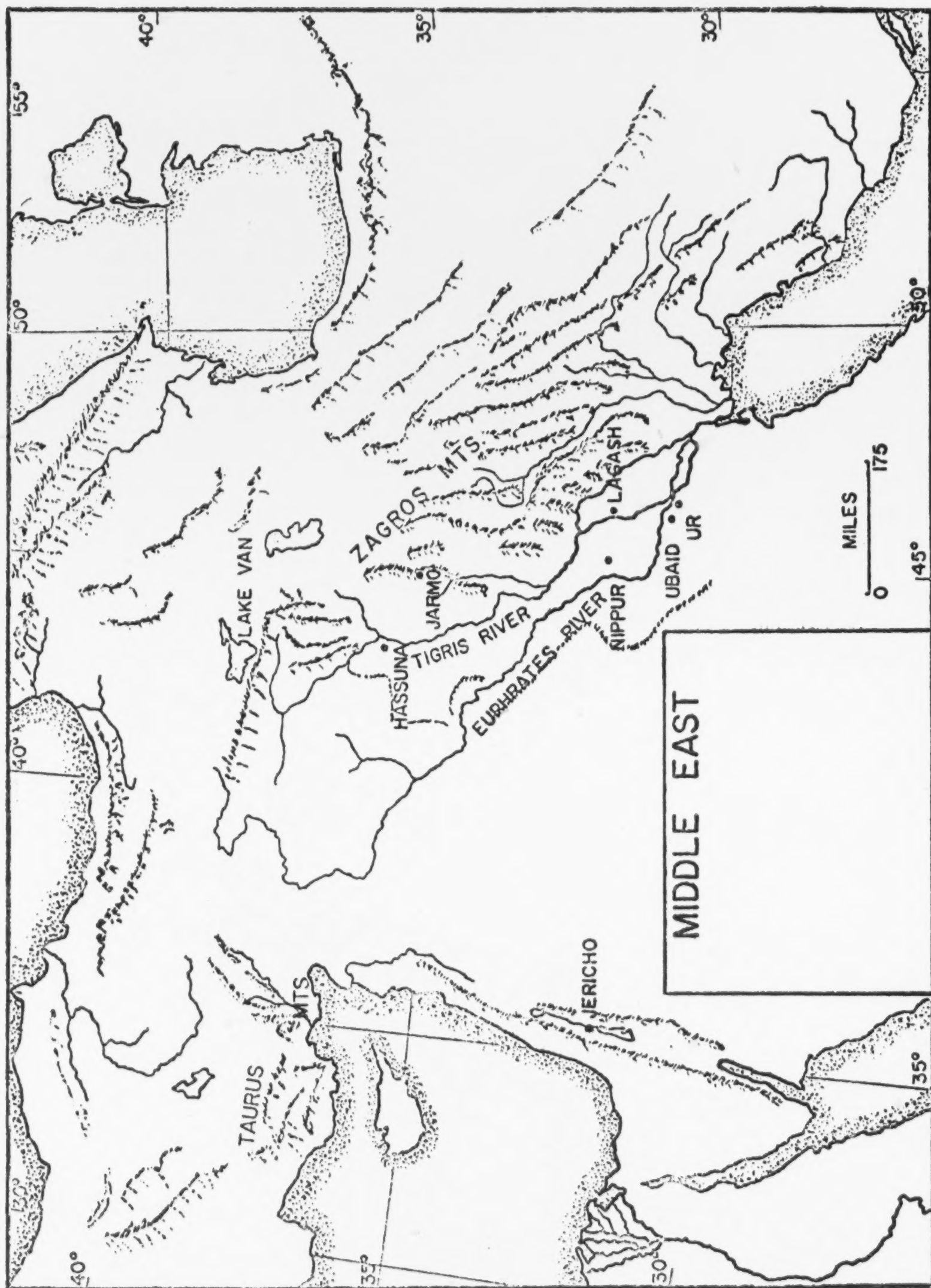
What happened between the beginnings of the Food Producing Revolution and our complex culture today? How did man develop civilization? The remainder of the work this semester may shed some light on answers to these questions.

QUESTIONS ON THE LOCI OF THE WORLD'S OLDEST CIVILIZATIONS:

- a. We have positive archaeological proof of six centers of civilizational development. Where are they?
 - (1)
 - (2)
 - (3)
 - (4)
 - (5)
 - (6)
- b. Are there any generalizations that you can make about where they are located?
- c. Name the three areas that have been postulated as centers but about which we do not have sufficient archaeological evidence to prove or disprove them as centers of civilizational development.
 - (1)
 - (2)
 - (3)

MESOPOTAMIA

- d. The arrows indicate diffusion of cultural traits or at least some influence. Which centers appear to have developed independently? Which didn't?
- e. What is the time difference between the emergence of the civilizational level in Mesopotamia and Northern China? What is the time difference between the same point in Mesopotamia and Northern China?
- f. Are there any other observations that you can make regarding these early civilizations?



MESOPOTAMIA

2. Your teacher will show you a series of transparencies concerning the geography of an area of the world where the earliest known civilization arose. From your studies in geography, what can you determine about the physical environment of this part of the world? Consider one aspect of the physical environment at a time. In the space below, record your ideas and observations as well as important points brought out in class discussion.

a. Landformsb. Drainage

Using the reading, "Regime of the Tigris and Euphrates," as a source, state below the major characteristics of the two rivers. What do they have in common? How are they different?

EuphratesTigrisc. Climate

Name the three predominant climatic zones of Mesopotamia shown in the transparency.

MESOPOTAMIA

Land of the Tigris and Euphrates

What is the land of ancient Mesopotamia really like?

In size, Mesopotamia is somewhat smaller than California. To the north and east of it are the mountains of Turkey and Iran. To the south of it is the shallow Persian Gulf. The southern part of this area is a hot alluvial plain. Much of these Mesopotamian lowlands is covered with marshland and braided river drainage. North of Baghdad is fertile plateau with more moderate temperatures and some rainfall.

Two rivers dominate the area. These are the Tigris and Euphrates. Both rivers cut around folds of the Anatolian Mountain system, where they are fed by melt-water. Then they cross the plateau uplands of northern Syria and Kurdistan and continue on a general southeast course across the hot plains of Iraq. Both rivers follow a fairly steep slope toward the sea. In some parts of the rivers the current is too swift for unpowered boats to go upstream. Both rivers also carry a great deal of sediment. They are at their lowest in September and October and rise from December on.

The Tigris is narrower than the Euphrates and it carries more water. It is closer to the Zagros Mountains and there are more streams emptying into it than into the Euphrates. Both rivers are subject to floods, but those of the Tigris are generally more sudden and more extensive because the surface run-off from mountain torrents flows into the Tigris. The Euphrates referred to in the Bible as "the great river, the river Euphrates," has two tributaries in the uplands, but none from the Syrian and Arabian deserts. There are empty watercourses which indicate that in the past there were more streams flowing into both the Tigris and Euphrates. Also, in former times, the two rivers probably once followed entirely separate courses and had different mouths on the Persian Gulf. Then the shore line of the Gulf was much closer to Baghdad.

MESOPOTAMIA

Study the reading "Climate" about the climate of the lowland region. Describe below how you think you would feel in a Mesopotamian summer. How about in the winter?

When does rainfall occur? What is the annual range in the lowlands?

In contrast, what is the precipitation over the Zagros Range?

Where in Mesopotamia would you expect to find the earliest farming villages? Why?

d. Vegetation

List the types of vegetation found in the region.

e. Soils

What are the 3 types of soils found in Mesopotamia?

MESOPOTAMIA

What implications do the soils of this region have for agriculture?

HOW SUITABLE DO YOU THINK THIS REGION WAS FOR THE RISE OF
CIVILIZATION?

MESOPOTAMIA

3. Read the article "Jarmo: An Early Farming Village." Then answer the following questions:
- What kinds of data indicating what life in Jarmo was like have been found?
 - What were some of the goods and services that were produced in the village of Jarmo? What resources were used in producing these goods and services? Be as specific as you can.

GoodsResources

- What domesticated plants and animals can we definitely say were present in Jarmo? What effects did domestication have on the production of goods and services there?
- With the types of implements that the people of Jarmo had, what kinds of soils would they have farmed? Explain.

MESOPOTAMIA

Jarmo: An Early Farming Village (7000 B.C. - 6500 B.C.)

We have learned the importance of the food producing revolution to human societies. The transformation of hunting and gathering societies into agricultural societies was certainly a marked change--a revolution in the patterns of human life.

The changes in human societies brought about by the change to food production have been aptly described by Dr. Robert J. Braidwood (an archaeologist from the University of Chicago).

Dr. Braidwood says that men were compelled as well as enabled to settle in larger communities. We are going to examine one such community, Jarmo, a farming community of some 9000 years ago (7000 B.C.) in modern day Iraq.

Jarmo is situated on a flat hilltop in the foothills of the Zagros mountains. Over the centuries, the terrain has been seriously eroded and Jarmo now lies at the very edge of a deep ravine which was once cut by an ancient river course. In fact, about one third of the original village has been washed away. (See page 3 of "The Agricultural Revolution.")² Jarmo lies inside but on the edge of what is called a "nuclear zone," a geographical zone which contains a great variety of wild plants and sometimes wild animals that could have been domesticated by man. (See the article "Wheat: the Kind of Cereals" in your manual for a listing of the plants and animals available to the people of Jarmo.)

We are going to try to get a glimpse of the way of life during the transition to settled farming communities. We are going to read the archaeological record of the oldest agricultural village yet discovered--Jarmo, Iraq (7000 B.C.). It must be pointed out that Jarmo may one day lose the distinction of being the oldest farming village in the world. Archaeologists are uncovering more evidence each day and older villages may yet be found. It has been discovered that the "nuclear zone" of Old World agriculture extends much farther than previously thought. It extends through Iraq, part of Palestine, Jordan, Turkey and Greece, an area much larger than the Fertile Crescent. Now let us turn to Jarmo.

1.

2. The page numbers used when referring to "The Agricultural Revolution" are those of the Freeman Reprint of this article from Scientific American.

MESOPOTAMIA

Jarmo was occupied continuously for approximately five hundred years sometime between 7000 to 6500 B.C. There have been at least a dozen levels of occupations uncovered. Jarmo was a very small village and may have been on the fringes of development. We do not know for sure. At any one time there were probably 150 to 200 people living in Jarmo in 25 to 30 three or four room houses. The houses in all levels were made of pressed mud or clay plastered with mud, though some later ones had foundations of stone. The roofs were made of reeds covered with clay and the clay floors of the houses were evidently covered with woven reed mats because the imprint of the matting has been preserved in the clay. The rooms were small but there were several of them in each house. Houses also had built-in ovens. (What did they use them for--heating, baking, firing pottery? We don't know.) The houses in the lower levels of the site also had built-in basins, probably used as hearths. Outside were large pits and it is supposed that they were used for storage. One might ask storage of what? The reply would be, why, grains--wheat and barley, the economic base of western civilization.

For years, archaeologists have been sending carbonized remains of grains to laboratories to be dated without realizing they were destroying valuable information. In 1954-55, a paleobotanist,¹ Dr. Hans Helbaek of Denmark, accompanied Dr. Robert Braidwood to the excavation site of Jarmo. He carefully collected and studied carbonized remains of plants and seeds. He also collected bits of baked clay that had the imprint of grains on them. These imprints are almost like a photograph of grains grown 900 years ago. (See page 7 of "The Agricultural Revolution.") From these specimens he identified two types of wild wheat, large grained Emmer and small grained Eikorn. He also found many specimens of large grained domestic Emmer wheat. The domestic Emmer could not have dispersed naturally. It could not have survived without the aid and care of man. Dr. Helbaek says, "...any domesticated plant is an artifact, a product of human manipulation."²

Dr. Helbaek found carbonized kernels of barley resembling the wild barley that grows as a weed in the wheat fields of Iraq today. He suggests that in ancient times people learned to harvest wheat first, and, in the process of cutting the wheat, barley was cut and used also. Later, barley was domesticated.

The first agricultural tools wouldn't be recognized as such by a modern farmer. They consisted of flint or obsidian tools that look like hoes or sickle blades and were used for harvesting (page 6 of "The Agricultural Revolution"), a wide variety of milling stones for grinding, and small stone weights presumably used on digging sticks. (The nearest source of obsidian was 2000 miles away at Lake Van. Locate it on your map.)

Did the people of Jarmo keep domesticated animals? Dr. Charles A. Reed, a paleozoologist from the University of Illinois, traveled half way around the world to try to answer that question. He was able to definitely identify bones of domestic goats in the occupation levels of Jarmo. He observed something very interesting about the distribution of the bones. By carefully classifying them according to the age of the animal when killed, he found a random distribution in the lower levels. However, in the upper levels, he found a greater proportion of

1. A Paleobotanist is a scientist who studies ancient plant life.

2. Helbaek, Hans. "Domestication of Food Plants in the Old World" in Science, Vol. 130, No. 3372, Aug. 1959, p. 365.

MESOPOTAMIA

young and nearly mature animals. Dr. Reed excitedly realized that he had discovered and recorded the earliest transition from hunting animals to domesticating them. The goats of the lower level were hunted and killed regardless of age; whereas, the goats in the upper levels were kept in the village, fed, and cared for. They were slaughtered only when they reached a certain age. Careful study of the horns of the goats reveals more evidence. There was a significant enough change in the shape of the horn spores of the upper level goats to say they were definitely domesticated by 6500 B.C.

As we mentioned earlier, the evidence that our friend, the dog, lived in Jarmo 9000 years ago does not consist of animal remains. The evidence is a clay figurine "with a waggley tail"--a tail curled over its back. The only canid that has such a tail is the dog.

The traces and impressions of the grains, the bone remains of goats, and the figurine of the dog indicate that the process of domestication had been going on for at least a thousand years and perhaps for as long as three thousand. But the farmers of Jarmo still had not learned to select the best seed for planting nor had they domesticated sheep, pigs, or cattle. Moreover, the bones of wild animals and the great quantities of snail shells, acorns, and pistachio nuts tell us that the occupants of Jarmo still hunted and gathered a substantial portion of their food.

The archaeological assemblages include: stone cups and bowls of excellent craftsmanship; beads, pendants and marble bracelets; bone awls and needles; a clay stamp with spiral motifs (which may have been used to apply tatoos); and decorative shells from the Persian Gulf (500 miles away). There were many composite tools, including knives and sickles, which probably had wooden handles. There were also tools of ground stone.

One very interesting type of artifact found in the assemblage from Jarmo is the pottery. The lower levels of occupation did not contain pottery at all. It appears in the upper five levels. The earliest fragments found (in level seven) are of fine workmanship and also well fired. The pottery found in levels eight through twelve is of poorer quality and badly fired. What does this suggest to you?

We might speculate about other aspects of life at Jarmo. For example, a large number of clay figurines were unearthed in excavations. Some are of animals but many of them are of pregnant women and have been called "fertility goddesses." Their presence may indicate the beginnings of a religious cult whose purpose was to help crops grow. It is possible that a few people made these figurines and proclaimed that they, and their figurines, had special supernatural powers. This is, of course, pure speculation.

Jarmo is only one of many communities that existed in the Zagros foothills during the ninth millennia B.C. A recent estimate of the total population of southwest Asia at that time is about 100,000. We could speculate that there were perhaps somewhere between 200 and 700 communities with populations of 150 to 500 persons. Most of these would have been in the foothills and mountain valleys where agricultural activities are possible. We cannot say that all of the early communities were at the same level of cultural development as Jarmo. Contemporary with Jarmo could have been villages farther advanced toward intensive agriculture and

MESOPOTAMIA

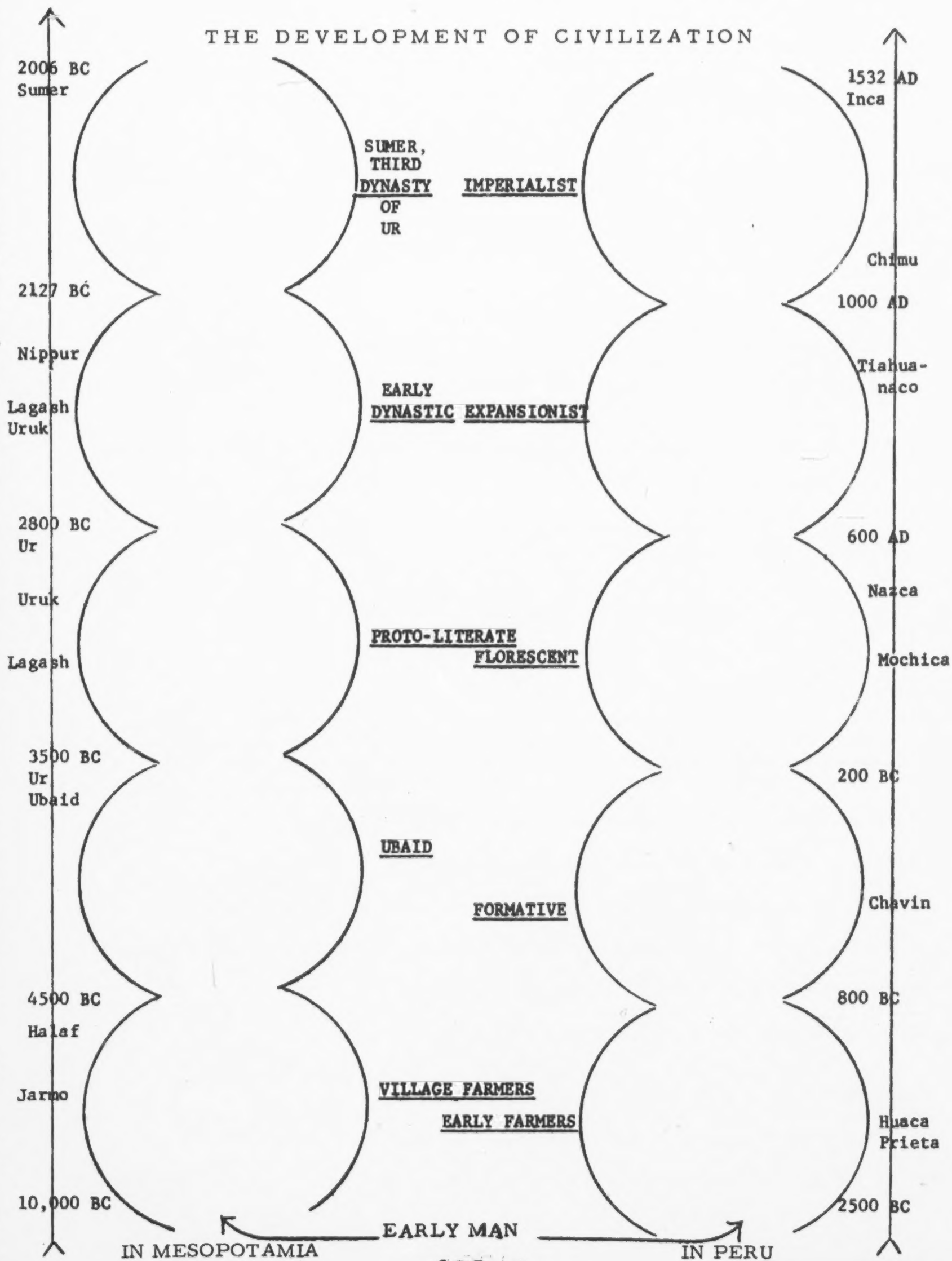
others that were just beginning to collect and harvest the wild grasses. Of course, there could also have been roving bands of hunters still living in temporary camps ignorant of the advantages of settled life.

It is interesting to note that the farmers today in the area of Jarmo do not grow domesticated Emmer wheat but a free threshing wheat. However, the area still supports about the same number of people (about 27 people to a square mile). Deforestation, soil deterioration, and erosion, the result of 10,000 years of human habitation, have offset whatever advantages modern technology and improved breeds of grain might have brought to the present population.

Bibliography

- Braidwood, Robert J., "The Agricultural Revolution" reprinted from Scientific American, Sept. 1960 by W. H. Freeman and Co., San Francisco.
- Braidwood, Robert J. and Howe, Bruce, Prehistoric Investigations in Iraqi Kurdistan (Chicago: University of Chicago Press, 1960).
- Helbaek, Hans, "Domestication of Food Plants in the Old World" in Science, Vol. 130, No. 3372, Aug. 1959, pp. 365-372.
- Helbaek, Hans, "How Farming Began in the Old World" in Archaeology, Vol. 12, No. 3, 1959, pp. 183-189.
- Reed, Charles A., "Animal Domestication in the Prehistoric Near East" in Science, Vol. 130, No. 3389, Dec. 1959.

THE DEVELOPMENT OF CIVILIZATION



MESOPOTAMIA

4. Your teacher will give you instructions about the chart on page 103.
5. Read the following data about sites in Mesopotamia which were occupied during the Ubaid period. Then answer the questions following the article.

The Ubaid Period

Hassuna 5800 B. C.

- (1) Hassuna produced a greater percentage of their food than did Jarmo. They can be described as an efficient agricultural community. Although their implements were still of stone, the people of Hassuna relied very little on hunting and gathering for subsistence.
- (2) The village of Hassuna produced good quality pottery, beautifully decorated.
- (3) They baked leavened bread, which is quite a technical advance.
- (4) Evidently the village had the same trade routes as Jarmo--shells from the Persian Gulf and obsidian from Lake Van.
- (5) The fertility cult is evidenced by a great number of fertility goddess figurines similar to those found at Jarmo.

Halaf 5000 B. C.

- (1) Halaf is the name of a site near Hassuna which is not pictured on the map. The Halaf culture, however, extends as far as the Mediterranean. These people cultivated a wider variety of cereals than the people of Hassuna. They kept two breeds of cattle as well as pigs and sheep--and, of course, goats.
- (2) Their pottery is technically better than that of Hassuna.
- (3) Their claim to fame is the first wheeled vehicle.
- (4) Also of major importance is the first appearance of copper and lead.
- (5) Their villages had cobbled streets and circular houses with stone foundations.
- (6) The fertility cult was still dominant.
- (7) Halaf pottery has been found as far north as Lake Van.

Ubaid 4500 B. C. - 3500 B. C.

- (1) The site for which this period is named is located very near ancient Ur.
- (2) Ubaid materials also appear in northern Iraq, farther north than Hassuna.

MESOPOTAMIA

Summary

The Ubaid is a period of expansion and unification. It also marks the shift of cultural development from northern Mesopotamia to the southern alluvial plain. There have been no earlier sites uncovered in the Tigris-Euphrates basin. This suggests that people migrated into the region during Ubaid phase. We are not certain where they came from. The environmental conditions encountered by the new populations arriving on the Tigris-Euphrates plain have been described vividly by Gordon Childe in What Happened in History:¹

MESOPOTAMIA

- a. What were some of the cultural advances (over the culture of Jarmo) made by the Ubaid period? List them below.
- b. Sometime during this Ubaid period, cultural development shifted to the river valleys. What would have been some of the advantages and disadvantages of river valley life?
- c. What are some changes you think a move from the uplands to the river valleys would have made in the way of life of the Mesopotamians?

MESOPOTAMIA

6. Read the following article and prepare for class discussion the questions at the end of the article.

The Proto-Literate Period - 3500 B.C. - 2800 B.C.

In Robert Braidwood's words,

Dr. Braidwood has described the Proto-Literate as the period of prehistory when man was standing at the threshold of civilization. It may be helpful to think of this period in this manner, but it is also wise to remember that this period of "threshold" was 700 years long. It is difficult to point to the exact century when man stepped over the threshold into the complexity of civilized life.

The cultural developments at this period may be summarized as follows:

1. The period may be characterized by the phrase "incipient urbanization" with cities like Ur, Uruk, Lagash, Eridu and Nippur emerging as urban centers.
2. Picture form writing appears on clay tablets which are the forerunners of cuneiform writing.
3. Intensive agriculture was practiced with dates and fish as added supplements to the diet.
4. Complex canal irrigation systems were maintained.
5. Trade was extensive and probably stimulated the cultural development in Egypt.
6. The potter's wheel was invented, cylinder seals were widely used and the uses for metal were expanded.
7. Large temple estates called ziggurats were built. The temple estates were supported through taxes by agricultural surpluses. The first writing probably developed to keep the temple records.

MESOPOTAMIA

7. Be prepared to discuss the following questions in class:
 - a. What effects would a complex irrigation system have on the culture of the people who built it?
 - b. List some of the developments which might have resulted in Mesopotamian river valley culture as a result of agricultural surpluses.
 - c. What would extensive trade indicate about a culture? Why was trade (both within the Tigris-Euphrates basin and as far away as India) so important in the development of civilization in Mesopotamia?

MESOPOTAMIA

- d. What are some different aspects of a culture that might be affected by the development of writing? How would they be affected? Do you think the development of writing was a necessary prelude to the development of civilization?

- e. How do you think Mesopotamian religion would have been affected by the move to the river valleys?

MESOPOTAMIA

8. An epic tale, the Epic of Gilgamesh, has come down to us from the time of the Early Dynastic Mesopotamians. Your teacher will play a tape on which this epic is told. As the tape is played, list below as many things about the culture of the Early Dynastic Mesopotamians as you can. Does this story remind you of any other familiar stories?

MESOPOTAMIA

Amplify your knowledge of the Early Dynastic Mesopotamians by reading the following article: Then prepare the questions after the article for class discussion.

Early Dynastic Period - 2800 B.C. - 2400 B.C.

- A. This period can be characterized by fully developed urban centers.

A typical city was divided into three parts:

Walled area surrounding the temple, the palace for administrators and royal officers, and all other public buildings;

The suburbs, where groups of individual houses were situated close to the fields;

The harbour sector, the center of activity for the typical Early Dynastic City. Here foreign traders lived and carried on their commerce with the city.

During the latter part of this period several of the important capitals of lower Mesopotamia emerged. The city of Uruk extended over 1,100 acres and contained possibly 50,000 people. Lagash included in its domain 1800 sq. miles and a population of 35,000 people. Each city had its patron god. For a good summary, read "The Origin of Cities" by Robert M. Adams.

- B. Technical writing developed at this time (cuneiform). Many of the tablets are our best source of information about this period.
- C. Agricultural endeavors were extended to large estates and workers were paid in goods. The estates were owned by a god (temple). It was during this period that dynasties emerged (hence the name Early Dynastic). The originally god-owned temple estates became god-king owned and administered. In the later part of the period all city land belonged to the temple and the king administered over the city. The god was considered the true ruler and the king his administrator. So far kingship was not hereditary.
- D. Warfare became increasingly crucial for the well-being and endurance of a powerful city. A constant struggle for power was waged between the various Sumerian City-States. The spoils of war were an important economic resource for cities. Victory in war depended upon the gods.
- E. Nippur emerged as the sacred city of all of Sumeria. The Sumerians worshipped a pantheon of deities, but each city had its patron deity or divine couple. The gods made their wishes known through oracles.

MESOPOTAMIA

- F. Sumeria influenced the development in the Indus Valley during the Early Dynasty.
- G. A rich class of Sumerians rose to economic supremacy through the manipulation of loans.

Akkad Period - 2400 B.C. - 2127 B.C.

This brief period is characterized by extensive trade (to Armenia, Cyprus and India). The first empire developed during this period. Its center of power was at Agade. The empire was controlled by royal families and the king was deified in his lifetime. (This period is not on the chart.)

8 (continued)

a. What can you say about Early Dynastic society?

b. What were some of the goods and services that were produced in Early Dynastic cities? What resources were used in producing them?

Goods	Resources
Services	

c. How important was religion to the people of Early Dynastic times? Give examples to support your answer.

MESOPOTAMIA

- d. Where was power placed in Early Dynastic times?
- e. If you were to choose certain changes which were essential to the emergence of urban life from village life in Mesopotamia, what would these changes be? Prepare a list of them.

MESOPOTAMIA

9. Sumer: The Third Dynasty of Ur

In about the twenty-third or twenty-fourth century B.C. (Some say it was in 2250 B.C. and others say it was in 2370 B.C.), something very important happened in Sumer. Up to this time there had been different city-kingdoms, each trying to "get ahead" at the expense of the others. Now there was unity. Sargon of Agade, (or Akkad, a land just north of Sumer), conquered all of Sumer and welded it into one state. The dynasty which he found lasted 100 years.

After the time of Sargon, there was an upsurge or revival of power and influence in Sumer. This time of revival, called by some a "new Golden Age," was the time of the Third Dynasty of Ur. It lasted from 2127 to 2006 B.C. (or 2124 to 2016 B.C., depending on whose dates you want to accept). Then it was overrun by peoples less sophisticated than the Sumerians, probably the Elamites from the East and the Amonites from the West. For two centuries these people controlled Sumer until the rise of Babylon to prominence in about 1800 B.C.

During the "new Golden Age" in Sumer, the most prominent city was the city of Ur. Ur had been vassal to Erech, but Ur-Nammu, ruler of Ur, turned the tables and gained control over Sumer. He called himself "King of Sumer and Akkad." According to one authority, Ur-Nammu "was a great conqueror and a great ruler, famous for his justice and his good works, whose dominions extended from the Persian Gulf to the Mediterranean, and his monuments were broadcast throughout the cities of Mesopotamia."¹ Remains of a law tablet indicate that one of the early acts of Ur-Nammu was to proclaim that during his rule he would see that people had fair dealings with each other, so that orphans would not fall prey to the wealthy, widows fall prey to the powerful, or poor men fall prey to wealthier ones.

Under Ur-Nammu and his descendents, Sumerian civilization flourished. Laws were set up that applied to all people in the realm. (Before, city law codes were regularly issued by Sumerian kings.) Some parts of the later Code of Hammurabi probably go back to the time of Ur-Nammu, though the "eye for an eye and tooth for a tooth" idea which was a part of the Code of Hammurabi and was a part of law codes described in the Bible, may not have been present. A law code, the code of Eshunna, dating from the early eighteenth century B.C., indicates that punishments consisted mainly of fines to be paid. The following provisions were taken from the code of Eshunna. Some of the same kinds of laws may have been a part of Ur-Nammu's law code.

MESOPOTAMIA

Sumerian commerce may have extended as far as Egypt, India, and Anatolia. We know that the Sumerians obtained metals from Asia Minor, Palestine, and the Persian Gulf. Sumerian influence probably spread even farther as dominion was extended and the victors and vanquished influenced each other. Goods were

MESOPOTAMIA

floated down the upper rivers and then were sold, boats and all, as wood was scarce on the plain. Even the stone used for carving statues had to be imported. The bustling markets in Sumerian cities did a lively business. Some money-lenders became wealthy. Metal had replaced barley as a medium of exchange.

Literary life flourished. Thousands of scribes were needed in the realm for a wide variety of tasks. Almost all transactions in Sumer were written. There was a sizable body of literature growing up, too. Schools, probably first connected with temples and later secularly controlled, developed. Their curricula included the science of the day, mathematics, literature, and Sumerian. Students often practiced writing cuneiform by copying literary works onto their tablets. (This was lucky for us, since sometimes several copies of the same work have been preserved and we can piece together the legible parts of each copy to get the whole work.) A class of educated officials and scholars came out of the schools.

One piece of literature which has come down to us describes some of the Sumerian agricultural practices. The Sumerians used irrigation extensively. In some places the land was so fertile that two or three crops could be grown per year. The grains grown were mainly wheat, barley, and millet. The following excerpt is taken from the text of a literary debate between summer and winter. Note the importance of the gods in bringing abundance.

MESOPOTAMIA

During the Third Dynasty of Ur, Sumerian crafts experienced a revival. Graves at Assur contained objects of silver, turquoise, gold, carnelian, and lapis lazuli that were as elaborate as grave offerings during the Early Dynastic period. Lagash, under the ruler Gudea (about 2200 B.C.), became a center for excellent sculpture. In Ur, there was a great deal of stonecarving. Figurines of both terra cotta and bronze were made. The bronze figurines were often made in one of three forms: a basket carrier, a bull lying down, or a kneeling god driving a peg in the ground. These figurines were often attached to pegs and were evidently driven in the ground when new buildings were constructed. Who knows, perhaps this is the origin of our "laying the cornerstone" ceremonies? There were probably craft guilds in major Sumerian cities by 2000 B.C. and contracts were made for teaching crafts.

Architecture was undergoing a revival, too. Walls around cities were made higher and wider for better defense and better flood protection. Houses contained a number of different rooms built around a central patio. The most famous kind of structure built during this time, though, was the ziggurat.

The ziggurat is an unusual feature of Sumerian architecture. No one is sure where the Sumerians originally came from, but perhaps they came down from the hills. People living in mountainous lands often worship their gods on high places. When the Sumerians came down to the alluvial plain, they found no high hills. Thus they built high places (ziggurats) for their gods. The steps of the ziggurats facilitated the descent of the gods to the earth. On top of the ziggurat was a small shrine and within it were underground chambers containing offerings.

Ur-Nammu had the Ziggurat of Ur rebuilt using the kiln-fired brick, replacing much of the old mud brick. The bricks are 15 inches or less long and they bear the royal seal. This may have been the accomplishment during his rule of which he was most proud.

MESOPOTAMIA

What do we know about Sumerian social life? For one thing, we know that marriages were contractual affairs arranged by the parents of the couple. Each man had one wife, though concubinage also existed. In the cities, families probably tended to live in smaller units (more nuclear than extended families). Women had rights and privileges and could do business and make contracts.

There were, in general, three classes of people in Sumerian cities. First, there were the government officials, religious leaders, scholars, and soldiers. In this class were included governors, ambassadors, sea captains, military officers, high tax officials, priests, managers, archivists, accountants, scribes, etc. Next were the free commoners, including farmers, laborers, artisans, toolmakers, shopkeepers, and merchants. In the lowest position were the slaves, including prisoners of war, criminals, debtors, etc. Even the slaves had their rights and privileges under the law, though, and they could not legally be mistreated.

Government in Sumer was tied closely to religion. We know that it took a great many officials--and a sizable civil service--to rule the Sumerian empire. These officials probably had religious as well as what we would term secular duties.

MESOPOTAMIA

9 (continued)

After you have finished the article "Sumer: The Third Dynasty of Ur," answer these questions.

a. What can you say about social life in Sumer (families, classes, etc.)?

b. How did socialization take place in Sumer?

MESOPOTAMIA

- c. Describe Sumer's money economy.
- d. Why was trade so important to the economy of Sumer?
- e. What summary statements can you make about Sumerian religion?
- f. What kinds of arts and crafts were present in Sumer?

MESOPOTAMIA

- g. What statements can you make about Sumerian government?
- h. How was the Third Dynasty of Ur different from the earlier periods of cultural development in Mesopotamia?

PERU

Your teacher will show you three slides. The following space may be used for notes about what you see in the slides.

a.

b.

c.

Compare what you have seen in these slides with what you know about similar things in Mesopotamia.

What resources were available to the people whose town was shown in the slides?

PERU

Introduction and Teacher Background

Part 2 - Peru and Conclusions

BIBLIOGRAPHY -- PERU

The following two books are basic sources of data for this section on Peruvian prehistory. You will want to read them both before you begin teaching this section. Your students may want to read parts of them, also.

Baudin, Louis. Daily Life in Peru (New York: The Macmillan Co., 1963), 256 pp.

Four chapters from this book have been included in the manual. It contains one of the best descriptions of the daily life of the Inca people before the Spanish arrived.

Bushnell, G. H. S. Peru (New York: Praeger Paperbacks, 1963), 216 pp.

This is an excellent reference on the prehistory of Peru. This book has been selected as the one source that will give the teacher an adequate background in the prehistory of Peru.

ADDITIONAL REFERENCES

*Baumann, Hans. Gold and Gods of Peru (Pantheon Books, 1963).

Bennett, W. C. and J. B. Bird. Andean Culture History (Garden City, New York: American Museum Science Books, 1964).

Bingham, Hiram. Lost City of the Incas (New York: Antheneum, 1963).

Bushnell, G. H. S. Ancient Arts of the Americas (New York: Praeger, 1965).

Gillen, John. "Moche: A Peruvian Coastal Community" (Washington D.C.: Smithsonian Institution, Institute of Social Anthropology Publication No. 3 June 1945).

Kosok, Paul. Life, Land and Water in Ancient Peru (New York: Long Island University Press, 1965).

National Geographic. Indians of the Americas (Washington D.C.:).

Prescott, William H. The Conquest of Peru (New York: Mentor Books).

Rowe, John H. Chavin Art, An Inquiry into its Form and Meaning (New York: The Museum of Primitive Art, 1962).

*(Asterisk) Indicates books that are very readable, but they contain value judgments and are not entirely factually accurate.

ERU

Introduction and Teacher Background

owe, John H. "Inca Culture at the Time of the Spanish Conquest," In The Handbook of South American Indians, Vol. 1, Steward, J. (editor). (Smithsonian Institution, 1944), pp. 183-330.

la Vega, Garcilasco. The Incas (New York: An Avon Library Book, 1961).

on Hagen, Victor W. Realm of the Incas (New York: Mentor paperback, 1957).

Weaver, Kenneth F. and Bates Littlehales. "Five Worlds of Peru" National Geographic, Vol. 125, No. 2 (Feb. 1964), pp. 213-265.

There should be other books or articles on Peru available in your school or local libraries.

ADDITIONAL AUDIO-VISUAL DATA USED

Slides: (Anthropology Project, Chicago)

- 121 Detail of the painted border of a mantle from Paracas Necropolis. An exceedingly rare example of the painting of that period. The design on this fabric is much freer and more alive than that found on the pottery and the weaving of Paracas Necropolis. The designs of these mantles are elaborate stylized cat demons, birds and anthropomorphized figures, arranged in repeat sequences, often alternating right side up and upside down. This shows a cat demon holding a human trophy head. This fragment was preserved for 2000 years in a bone-dry burial vault.
- 122 &
- 123 A Paracas mantle and detail. The Paracas Necropolis is justly famed for its turbans, ponchos, skirts and shawls, characteristically decorated with over-all polychrome embroidery. The amount of time required to spin, dye, weave and embroider any one of the thousands of large Paracas textiles must be estimated in years. Furthermore the craft standards for the weaving were exceptionally high. In spite of the quantity of material the workmanship is of uniformly high quality, and the designs, in spite of their complexity, are amazingly consistent. This mantle is about 5 x 7 feet and is made of cotton and llama wool.
- 124 Paracas pottery. Paracas ceramics are noted for variety of shapes including open bowls, dishes, collar jars, bottles with flat handles and containers with spout and bridge to modeled heads. Most of the vessels have a dark base color and are decorated by modeling, incision, applique, two-color negative painting, and a special type of post-fired painting in bright canary yellow, green, red, and black. The color areas are usually separated by incisions. Decorative designs are largely geometric but some of the incised designs bear a resemblance to the Chavin feline.

PERU

Introduction and Teacher Background

- 125 Mochica earplug. The golden earplug is deftly inlaid with shell and turquoise, and decorated with the figure of a warrior wielding mace, shield, and sling with a golden sling stone. The earplug is about 4 inches wide and was worn about 1700 years ago by one of the Mochica nobility.
- 126 Mochica pottery. A nobleman's portrait adorns a 1700 year old clay jar found on the north coast of Peru. The vessel is in the style of the Mochica culture, one of the precursors of the Inca empire. Better quality Mochica vessels were mold made. The outstanding characteristics of these ceramics are skilled modeling and the delicate painting in red and cream white. The stirrup-spout vessel, although found in nearly all the North Coast periods, was a particular favorite of the Mochica.
- 127 Nazca pottery. The most characteristic forms of Nazca ceramics are bell-shaped cups, tall goblets, containers with two short tubular spouts connected with a flat bridge, and vessels with spout and bridge to modeled head. They are characterized by polychrome painting in as many as ten colors, including several shades of red, white, cream, grey, buff, black, yellow, brown and violet. The designs on some of the early vessels are simple, somewhat realistic representations of birds and animals. More typical, however, are the elaborate stylized designs of anthropomorphic monsters, felines with elongated bodies and human figures carrying staffs.
- 128 The "Gateway of the Sun" at Tiahuanaco, Bolivia. This site is believed to be one of the places of the origin of Tiahuanaco style, which spread widely throughout the highlands and the coast of the Central Andean areas. The lace-like pattern of the relief emphasizes the grandeur of the monolithic form.
- 129 A featherwork mosaic. An eye (upper right) with a stripe or tear dominates this detail from an abstract design created with feathers. Below and to the left is a feline mouth. The step design at the bottom is a stylized representation of the tail. Abstract designs made up of repeated stylized parts of the puma are typical of the Tiahuanaco-style influence. After 900 years the colored feathers, taken from gaudy birds, stay bright because they had been placed in a burial site in a dry area. Workers in the Tiahuanaco period used feathers from brightly plumed birds found in the distant Amazon rain forest. Feathers were either cemented on or attached to yarn and then stitched to the fabric row by row.
- 130 Carved clay wall decorations from a palace courtyard at Chan Chan, the capitol of the Chimú kingdom. 14th-15th centuries.

PERU

Introduction and Teacher Background

SLIDES

PERU: ARCHAEOLOGY (ISBELL SERIES)

- 1168 Lake Titicaca. Lake Titicaca is the largest lake in South America, covering about 3500 sq. mi., and the highest lake this large in the world. It lies between southern Peru and western Bolivia at an altitude of 12,508 ft. This slide is only one small arm of the lake. Note the steamer in the port in the lower right corner of the slide.
- 1169 The Glaciated Andes. The glaciated Andes or "Cordillera Blanca" seen as you climb up the Casma Valley. The altitude is fourteen thousand feet and the snow capped peaks are twenty-one thousand feet.
- 1170 The Casma River and Valley. Today in Peru, as in ancient times, cultivated fields are situated on the banks of small river valleys. Only with irrigation and/or terracing can cultivation be expanded.
- 1171 Ruins in the Moche Valley. Pictured here are ruins in the mouth of the Moche Valley in northern Peru as seen from the air. The last recorded rainfall in the Moche Valley was in 1924. The ancient site has been completely covered over with sand. From the ground it is not noticeable. From the air, however, one can distinguish the remains of the structures. On the left is the bed of a former river. Note the cultivated fields and the irrigation canals.
- 1172 The Rainforest. This picture was taken in Colombia on the Capa River, but the rainforest environment and way of life on the eastern slopes of the Andes in Peru is very similar. Note the two round, thatch roof houses. This kind of house is typically 40 to 50 feet in diameter.
- 1173 Puna Bunch Grass. The puna bunch grass is found above cultivable lands at 15,000 feet altitude. This type of vegetation is very important for grazing herds of alpacas and llamas.
- 1174 Living Quarters in Chan Chan, Peru. Pictured here are walled-in living quarters. The outside wall is about 20 feet high. This is one of the many such walled-in sections of the city of Chan Chan, which covers eleven square miles and had an estimated population of 50,000 in 1100 A. D. Chan Chan is located in the Moche Valley in northern Peru.
- 1175 A Large Building Complex in Chan Chan, Peru. This slide shows a reconstruction of one of the larger building complexes. A long ramp leads up to the entrance and the walls of the building are 15 to 50 feet high. This might have been a government building or the home of a noble.
- 1176 A Reconstruction of a "Huaca" in Chan Chan. The workmen are still busy cleaning the walls of the large building complex pictured in Slide 1175. This wall is decorated with several arabesques in which intricate small unit designs are cut out of the thick clay plaster. (See Slide 130 for a close-up of one of the arabesque designs.)

PERU

Introduction and Teacher Background

The word "Huaca" is currently used to denote anything ancient--a structure like the one pictured, a mound, a vessel or a gold object. The word has a different origin however, in ancient Quechua. It meant "That from which I come" and was associated with burials and burial objects.

- 1177 Machu Picchu. Shown here are the ruins of Machu Picchu, Peru, as seen from the old Inca road to Cuzco. The greatest part of the living area can be seen.
- 1178 A Small Individual House at Machu Picchu. The roof of this house has been reconstructed. The whole front is open. This was probably the house of one of the "common folk." Note that there are two types of stonework, probably just a preference of style.
- 1179 The Temple of Machu Picchu. This is a view of one of the inside walls of the temple at Machu Picchu. The meter is open to one yard. The stonework is excellent; the stones were cut to fit and put in place without mortar. The black streaks are from weathering.
- 1180 Gateway of the Sun, Tiahuanaco. This is a close-up view of the detail on the Gateway of the Sun at Tiahuanaco, Bolivia. The upper figure is called the Staff God. This figure, as well as the front view figure on the bottom, widely distributed during the Formative and the Classic periods of Andean culture. (See Slide 128 for a full view of the Gateway.) The Staff God motif is used in Andean arts and crafts today but its meaning has been entirely lost.
- 1181 The Black and White Portal at Chavin, Peru. Chavin is the modern name of a small town located in a fertile valley on the northeastern slope of the Andes. The altitude is about 10,200 feet. See transparency 142 and the Chavin overlay for the known distribution of the Chavin Art Style. It is hypothesized that the Chavin religion influenced a much larger region than is known.

This portal leads to a temple shrine. The temple consists of a number of rectangular structures up to 40 feet in height, which appear to be platforms of solid masonry designed to support the shrines on top of them. The significance of black and white may have had some religious symbolism. We can never know for sure. The black column is black limestone and the white is granite.

- 1182 Carving on Portal Column, Chavin. This is a close-up view of the carving on one of the columns of the portal. The column is carved with a single figure. The figure has many eagle attributes but the fang like teeth of a cat are prominent.
- 1183 One of the Megalithic Heads that Adorn the Temple's Facade. This head is one of the many that were put into place by carving a stone insert to fit into the wall. It is a human head but notice the long fang-like teeth. Feline features, as this one, appear frequently in Chavin art.

PERU

Introduction and Teacher Background

TRANSPARENCIES

- Tr. 118 Landform Distribution: World
- Tr. 119 Climate Distribution: World
- Tr. 123 Vegetation Distribution: World
- Tr. 124 Soil Distribution: World
- Tr. 142 Ancient Peru
 Note the corrections for this transparency. The Legend should read:
 Mochica culture - 200 B.C. -600 A.D.
 Nazca culture - 200 B.C. -600 A.D. (not 1000 A.D.)
 spread of Tiahuanaco
 Early Period - 600 A.D. (not 1 A.D.)
 Late Period - 1000 A.D.

PICTURES

You will find some of the plates in Peru by Bushnell particularly useful.

There are also good illustrations in Gold and Gods of Peru by Hans Baumann. The book is written very excitingly, despite the inaccuracies, and you may want to read parts of it to your students.

See also "Five Worlds of Peru" and Indians of the Americas for illustrations.

ADDITIONAL ACTIVITIES

You may wish to obtain and show to your class several reproductions of Peruvian artifacts. Perhaps there will be people in your community who have been to Peru who could speak to your class or show slides. Perhaps several of your students would like to build models of an Inca irrigation system or Inca buildings.

REPRODUCTIONS FROM THE UNIVERSITY MUSEUM

Address orders to: Sales Department, The University Museum, 33rd and Spruce Streets, Philadelphia, Pa. 19104

All orders must be prepaid and if you prefer parcel post there is an additional charge. Allow at least 30 days for delivery.

0222	Stirrup-spouted effigy vessel, the common form of Mochica pottery from the north coast of Peru. About A.D. 100. Rust and buff color 8 1/2 in. high.	8.50
0201	Peruvian effigy vessel in the form of a mortar, dating from Chavin Period about 300 B.C. This vessel is in the shape of a puma or jaguar. Black 7 1/2 in. high.	10.00

PERU

Introduction and Teacher Background

FILMS

THE INCAS. University of Illinois (c), i-j-h, 11 min., 1170, color: \$3.80.
University of Indiana. 10 min., sd, color, GSC-869: \$3.65.

The film briefly describes the extent of the Inca Empire at its zenith during the 16th Century when the Spaniards arrived. Also, it mentions the domesticated plants and animals of Peru and has very good shots of methods of cultivation, including a close-up of a foot plow used today that has not changed since Inca times.

The crafts shown are silver and gold work and both modern pottery and ancient funerary ware. (You might point out that the very elaborate pottery was made strictly for burials. The every-day pottery probably was very similar to pottery used today.) Also, the back-strap loom is shown. It was used in Inca times and is still used today.

The last portion of the film is a flash-back to 1500 A.D., Pre-Hispanic times, depicting two runners on the road to Cuzco with a quipu to be delivered. A government official receives the Quipu and has it "read." (The quipu was the Peruvians' only means of recording, as they did not have writing. The quipu was an account book of sorts. It was a series of knotted cords, each type of knot and color meaning something different. Page 135 of Peru and page 160 of Daily Life in Peru have pictures of a quipus. If you do not use the film, The Incas, it is suggested that you assign the reading, "The Knotted Strings and the Method of Numbering," which is in the student manual. You may wish to assign the reading even if you use the movie. Quipu-like accounting, by the way, is still used by Andean herds-men to keep count of their flocks today. They keep a knotted record instead of a written record.)

The film ends with shots of an Inca priest praying at the Sacred Stone at Machu Picchu.

INCAS: ANCIENTS OF THE ANDES. University of Illinois (hfe), i-j-h, 10 min, 01967, bw: \$2.15. University of Indiana. 10 min, sd, color. GSC-257: \$3.40.

This film may be used as an alternate if The Incas is not available. It is very similar to The Incas in its approach and description of ancient Peru. It has one serious error. It states that Peru was populated by groups migrating south by sea. This is hardly likely; no remains of any kind suggest sea-worthy boats.

The theory that South America was populated by migrants moving farther and farther south by land has long been held by archaeological circles. A current suggestion is that Peru may have received sea faring peoples from the Pacific Islands. This hypothesis is being investigated with enthusiasm today.

PERU

Introduction and Teacher Background

LIFE IN THE HIGH ANDES. University of Illinois (c), i-j, 11 min, 01181, color: \$3.80. University of Indiana. 11 min, sd, color. GSC-864: \$3.65. Also b & w GS-864: \$2.15.

This is a short film on a farm family of the "altiplano" or high plain of Peru. The film has various scenes of the family harvesting potatoes and corn, going to market, and taking the llamas to pasture on the high "puna" or grassland. The film does not deal directly with the Inca. An interesting exercise might be to compare the life of this family with what the life of an average farm family was probably like in Inca times.

PERU--PEOPLE OF THE ANDES. University of Illinois (eb), i-j-h-c, 16 min, 50731, color: \$5.65. University of Indiana. 16 min, sd, color GSC-780: \$6.40. b & w GS-780: \$4.15.

If your students have become very interested in cultural change, this film would be excellent to use.

The film opens with a brief discussion of the history and geography of Peru: the desert, the river valleys, the rain forest and the cultural development in these varying environments.

The main subject of the film is the life of a farm family in one of the river valleys: how they cultivate, harvest, and store their potatoes in the time honored manner of the Incas.

The film discusses such changes introduced by the Spanish as reading and writing, wheat, cattle, and Christianity. The changes that are reaching the quiet farming communities are dealt with, namely education and the development of mining as an important factor in the Peruvian economy.

The film shows excellent market and bartering scenes and a "fiesta." It ends with shots of the modern city of Lima and mentions that change is reaching the peasant highlanders.

FARMERS OF THE ANDES: PLATEAU AGRICULTURE. University of Illinois (hfe), j-h-c, 11 min., 01798, bw: \$2.15.

This film illustrates the way of life of Indians in Peru today. It shows their agricultural procedures, weaving, and market day. Many of the activities pictured have changed little since the time of the Incas.

PERU

Introduction and Teacher Background

TEACHER BACKGROUND

The civilization which arose in Peru was distinctly different from the civilization which arose in Mesopotamia. Peruvian civilization arose independently at a much later time and in a different place. There were different resources in Peru to draw upon. Much building in Mesopotamia was done with clay; whereas, many of the buildings in Peru were made of stone. Call your students' attention to the differences between New and Old World domesticates which they studied about in The Food Producing Revolution section.

There are some aspects of Peruvian development that your students should become familiar with. Use the students' knowledge of data and concepts which they learned in the first course and in the Geography Unit. They should be able to point out changes in social, economic, and political patterns and relevant geographical factors in the cultural development in Peru. Note the importance of religion, food surpluses, transportation networks, division of labor, trade, social distinctions, military machines, communication systems, and cities. Explore with your students the consequences of doing without writing and the Peruvian substitutes for it. Attempt to define the role of the city in cultural development in Peru. What is so important about cities? What do they do? Were they essential to the emergence of civilization? Why? Note that cities serve the function of allowing large numbers of people to live in a relatively small area in which necessary resources, as food and raw materials, can be made available so that work other than farming can be done. Power is exercised more easily over this smaller area.

Two articles are included here for your benefit. "The Central Andes" by Donald Collier provides a lot of additional data relating to cultural development in Peru.

The article, "The Peruvian Co-Tradition," presents a concept which is useful in describing the cultural similarities characteristic of a large area. This concept could be usefully applied to Mesopotamia as well as to Peru, as it is applied here. Note the emphasis on the growth and development of the Peruvian co-tradition and on the interrelationships of cultures which brought this about.

RELATIVE CHRONOLOGY - PERU

The material presented here can hardly pretend to be an exhaustive survey of Peruvian prehistory and it is strongly urged that for an adequate class presentation the teacher familiarize himself with at least some of the popular, summary literature easily available in inexpensive paperback publications.

This manual attempts to present, with specific examples, a cultural developmental sequence as it is believed to have occurred in ancient Peru. While reading various works about Peru the teacher will undoubtedly notice considerable disagreement among the various authors on initial and terminal dates for the various periods. This springs from different interpretations of data as well as the constant

PERU

Introduction and Teacher Background

revision of the "calendar" as new material becomes available. However, of far greater importance than an exact date on the Christian calendar, is an adequate relative chronology--the placing of ancient cultures within a developmental sequence with the proper relation to preceding and antecedent cultures. We cannot emphasize enough how important it is for the students to get some idea of the developmental sequence of the Peruvian culture. The dates ascribed to each period are only an aid in conceptualization, and they are extremely arbitrary.

The following is a brief outline of Peruvian relative chronology as presented in the manual:

before 2500 B. C.

1 - Early Man - Asiatic folk arrived in North and eventually South America via the Bering Strait, south through Panama and along the Andes. Food was acquired by hunting wild animals and gathering wild plants. The period is brought to an end with the apparent colonization of the sea shore and an emphasis on fishing and collecting shell fish. Permanent villages on coastal bays and river valleys may have afforded the opportunity for man to observe the seasonal growing cycle in one place long enough to begin to comprehend the mysteries of plant reproduction.

2500 to 800 B. C.

2 - Early Farmers (example--Huaca Prieta) - The first farmers still relied primarily on wild resources, but these were probably intensively collected within a fairly small area. Agriculture was a supplement in the diet, but increased food production enabled human populations to live in permanent or at least semi-permanent settlements and to congregate in larger groups. Greater numbers of people mean more concentration of creative genius, and with permanent dwelling areas, there are outlets for that genius as well as stimuli to produce more material possessions than can be conveniently carried by the owner.

800 - 200 B. C.

3 - Formative (example--Chavin) - This is the period of developed village life and quantitative increase in material culture. Elaborate architecture, ceramics, and sculpture are typically present as are simple to highly developed temples. A specialized priestly class is indicated and life was undoubtedly based on full time agricultural production by the majority of the population. Care and selection by human hands evolved improved plant and animal domesticates and a nearly balanced vegetable diet was probably obtained by addition of new cultigens as well as borrowing of old ones among different peoples.

200 B. C. - 600 A. D.

4 - Regional Florescent (examples--Mochica and Nazca) - If the Formative may be described as a time of discovery of new crafts and arts, the Regional Florescent may be described as a period of perfection and maturation of techniques.

PERU

Introduction and Teacher Background

Ceramics and weaving were carried to their maximal development in Peru during this time and rival any in the world. Sculpture, architecture, and, we might assume, social organization underwent considerable change, and by the end of the period, the temple-oriented village or town was on the threshold of the Urban Revolution and its priestly administrator was turning into the secular authority. Agriculture was intensive and public works include religious structures, and, apparently, forts, and elaborate soil reclamation and irrigation projects.

600 - 1000 A. C.

5 - Expansionist (example--Tiahuanaco) - Based on intensive agriculture and perfected farming techniques, the Expansionist period witnessed the rise of powerful secular authorities and huge population concentrations. Public works of a ceremonial nature became monumental in size and megalithic stone architecture was perfected. One art style, that of Tiahuanaco, was spread throughout Peru, probably by religious proselytizing, military conquest, and commerce. Bringing to an end the regional isolation and emphasis upon aesthetic perfection, the Tiahuanaco stimulus left in its wake new concerns--administration, conquest, and mass production.

1000 - 1532 A. D.

6 - Imperialist (example--Chan Chan) - Urban centers such as Pachacamac, Chan Chan, and Cuzco typify the Imperialist period, which represents, until Inca unification, a resurgence of local styles. Craftsmanship (the qualitative) in ceramics, weaving, and metallurgy declined during this time, but mass production (the quantitative) was tremendously emphasized. Communication and trade were extensive, though regional empires maintained fortified boundaries. The strength of religion was apparently declining in the face of powerful secular authorities.

PERU

RECOMMENDED TIME TO SPEND WITH THIS PART OF SECTION V: 10 days

125

Slides

To introduce Peru show Slides 1177, 1178, and 1179 (Machu Picchu). However, do not tell your students what these slides are picturing. Show slide 1177, which is Machu Picchu seen from the old road to Cuzco, and ask them what they think this is. It is obviously the ruins of something. Someone will say it is a town. Ask them to guess where it is (they should know it is in Peru) and what period of time it was occupied. See if anyone can tell what landforms and vegetation are evident. (The site is near the top of a hill or mountain.) Ask if anyone would care to guess what type of climate this town has. Does the town appear to be well planned and laid out?

Next show slide 1178, a small stone house with a thatch roof. Ask what they think this is. A dwelling? What is it constructed of? What knowledge, tools, etc., would be required to construct it? About how many people probably live here? Etc.

Slide 1179 is an example of the best stone work in the New World. Tell your students that this is the interior wall of a building in the town. Also point out that the tape measure is open to one yard. We know this is a mountain top from the first slide, so how were these stones brought to the construction site? The Incas used human labor to transport loads. What was necessary, then, to make this effective? (There had to be ways to make people work, overseers to supervise them, etc., leading to different social positions and governmental positions.)

Ask your students if they think this town was contemporary with Jarmo? Nippur? Later? (Refer them to their notes on the transparency showing the loci of the world's oldest civilizations or reuse the transparency.) Ask them to compare what they have seen of Machu Picchu with what they know of towns in Mesopotamia.

What resources were available to the people who lived in Machu Picchu? How do these compare with the resources available to the people of Sumer? Your students should recognize that they really need to know more about the physical environment of Peru to answer these questions.

1. THE NATURAL ENVIRONMENT OF PERU

129

Before we can begin to understand the cultural development that led to the Inca Empire, we must understand the natural environment of Peru. It is an environment that contains the driest desert in the world, glaciers, tropical rainforests, mountain peaks that reach twenty-one thousand feet, and the highest plateau at twelve thousand feet called the "altiplano," which means the high plain. This cold and barren plain stretches around Lake Titicaca.

PERU

GEOGRAPHY OF ANCIENT PERU

Transparencies

The section on the physical environment of Ancient Peru should take no longer than one period. You should work with transparencies number (Tr) 142, 118, 119, 123, and 124. The latter four transparencies depict elements of the physical environment on a world projection. We are concerned with a rather small area of South America, so in order to emphasize this area it may be a good idea to cut a 3/4 inch square hole in a plain sheet of white paper and place this over the area of interest when using the colored overlays so that attention will focus on this area. Also, use slides

Slides

- A. Begin with Tr. 142 so that the students can see precisely what area in the world we are interested in. First show the base outline map and the drainage pattern and then ask the students what they know about the:

Landforms and Drainage in this area. After you have received as many responses as desirable, use the river and mountain overlays on Tr. 142. Also turn to the world arrangement of landforms (Tr. 118). Focus on the area of interest with the windowed paper so that the students can check their responses and make additional ones. They should note their ideas and important responses in the space provided in their manual. Important points that should be covered are the following: (1) Notable lack of coastal plain except in extreme north Peru. (2) The Altiplano (high plains) of Peru and Bolivia that includes the huge Lake Titicaca. (Show Slide No. 1168, picturing this lake and the adjacent land.) (3). The dominance of hills and mountains with accompanying wide valleys that parallel the continental border. (Use Slide No. 1169 to show the glaciated Andes. Some of the highest peaks here rise over 21,000 feet. This may serve to dispell the notions of some students that South America is one big steaming jungle. (4) The interior plains that are a part of the Amazon Basin. (5) The continental divide, which in some places is merely 50-70 miles from the Pacific coast. (The river Marañon is a tributary of the Amazon.) (6) Numerous small short rivers that flow into the Pacific after draining the western slopes of the Andes. (Show the slide of the Casma River and the very narrow valley it has cut. Slide No. 1170).

- B. Climate--Again focus on Tr. 142 showing the outline, drainage, and mountain overlays to the students. (From the prior knowledge that the students have, discuss the climate of this area. After discussion turn to Tr. 119 to check the students' comments and add where necessary. Important points that should be covered are the following: (1) Along the coast of Peru and northern Chile and extending into the highlands is the very dry Peruvian Atacama desert. The teacher may want to note the abrupt change in climate along the western coast from the equator to 30° south latitude. Tropical rainforest in Ecuador at the equator becomes tropical savanna and then near the border of Peru the dry climates begin. (Show Slide No. 1171 so that the student

PERU

can get some idea of the aridity along the coast and also Slide 1168 to show the aridity in the highlands around Lake Titicaca.) At Lima the annual average rainfall is 1.8 inches. This drops to .4 inch in Arica in northern Chile and no rainfall has ever been recorded at Calama (7500 elevation), located back of the coastal plateau at 22° south latitude. (2) The mountains here, like other mountainous areas of the world, distort the climates so that no one particular type prevails and it is commonly referred to as undifferentiated climate. (3) East of the Andes the tropical rainforest and savanna prevails. (Show Slide No. 1172 showing evidence of tropical rainforest east of the Andes.)

C. Vegetation--Before turning to a transparency, ask the students what kind of vegetation they would expect here. After getting the students ideas, turn to the vegetation map and bring out the following points: (1) The very abrupt climate change along the coast provokes a sudden change in vegetation. In northern coastal Peru scrub forest, savanna, and shrubs can be found, but south of the Lambayeque River the land is virtually barren of vegetation. (2) The highland vegetation is quite complex. Trees occur mostly in the north and east (Show Cuzco scene), where rainfall is more plentiful. The greater part of the highlands, however, is covered with various kinds of grasses and shrubs which become increasingly xerophytic (drought-resistant) toward the south. (Show Slide No. 1173, which pictures bunch grass found in the highlands and also Slide 1168 which shows a notable lack of vegetation in the southern highlands at an elevation of 12,000 feet--Altiplano.) Puna is the name of the widely spaced bunch grass and xerophytic shrubs found in the middle and southern highlands. The puna bunch grass, found above cultivable lands at 15,000 feet, is very important for grazing herds of alpacas and llamas. (3) The vegetation east of the highlands in the north and central portion is the tropical rainforest of the expansive Amazon Basin. (Show Slide 1172 again.) East of the southern highlands, grasslands prevail.

D. Soil--Three important aspects of the physical environment have been considered thus far and each of these is a factor in soil formation. What kind of soil would one find here, given the circumstances that prevail? Points that should be brought out are the following:

- (1) There is virtually nothing in the way of a mature soil profile either along the coast or in the highlands. The students should recall that desertic soils scarcely deserve being called soils. Their profile is very thin, they lack humus, and they are very porous. In the highlands, where run off is quite rapid, when precipitation does occur, the soils would be confined to the valleys and would not be considered one of the major soil types. Given these circumstances, ask the students what is necessary for agricultural endeavors. (Irrigation and terracing) They should know that many of the desertic soils can be quite productive if water can be directed to them.

PERU

- (2) They should note the latosolic soils east of the Andes. These are the leached red soils, whose productive capacity is quickly consumed once they are cropped. Bananas and tubers are the chief crops here, but the tropical forest also supplies an abundant array of wild plants that are gathered, such as fruits, nuts, berries, seeds, and many others that are not only food plants but supply many other products. The best example of such plants is the palm tree. The palm tree and its products are used in house construction, basketry, as fiber for clothes, as ornaments, hammocks, fishing tackle, starch for making bread, sap for wine, and as the fruit for a sort of punch. An edible larva is also extracted from its decayed trunk. (Taken from "Use of Wild Plants" by Levi-Strauss in The Handbook of South American Indians, Vol. 6, p. 469.)

E. There is probably no other area on the earth surface that man encounters such abrupt extremes in both landform and climate in such a short distance of horizontal space. The slides of the desert No. 1171, the Casma Valley No. 1170 and the glaciated mountains No. 1169 were all taken in an eight hour journey by car. (The air shot of the desert was the departing point for the overland trip thru the Andes.) You might ask your students whether they think this wide variety of physical environments was a help or a hindrance to the development of Inca civilization. It was probably both, for different reasons.

- 131 2. Have the students read the paragraph written by Donald Collier describing various aspects of the physical environment of Peru. They can then answer the summarizing questions after the article.
- 141 5. MOCHICA: Show your students Slides 125 and 126, A Mochica Earplug and a Molded Portrait Vessel. Ask them what inferences

Slide No. 125. A Mochica earplug (earring), which is about four inches wide and was worn by a Mochica nobleman. The gentleman portrayed on the stirrup-spouted vessel in slide No. 126 probably wore such an earplug. The golden earring is deftly inlaid with shell and turquoise, and decorated with the figure of a warrior wielding a mace, shield, and sling with a golden sling shot.

Slide No. 126. A molded portrait vessel probably of a noble or chieftan. Point out the stirrup-spout.

they can draw about Mochica culture. You may also want to show them plates 24 and 25 (relating to Mochica of a late period) in Peru by Bushnell. Plates 11, 12, 13, 14, 15, and 17 show pottery of cultures that preceded the Mochica on the north coast. A copy of a Mochica stirrup spouted vessel can be obtained from The University Museum, Philadelphia, Penn. 19104. See pg. 36 of the catalogue.

PERU

You may also want to read the episode of the burial of the warrior priest, pp. 83-85 in Peru by Bushnell, to your students.

If you have the Mochica stirrup-spouted effigy vessel, show it to your students. Let them look closely at it.

Assign the articles on the Mochica and the Nazca. Make sure your students check the locations of these cultures on their maps. Ask them to be watching for similarities and differences in the two cultures. Why do these similarities and differences exist? Not only were cultural traditions somewhat different in these two regions, but the Mochica and Nazca cultures developed in different physical environments. How are these Florescent cultures different from earlier cultures in Peru? Have the students check the inferences they made earlier.

The Mochica pottery is remarkable in that the molded and painted vessels depict every phase of Mochica life. There are pots that portray judges handing down sentences to offenders. Other vessels showing people with noses, ears or lips cut off indicate that such mutilation was a common "sentence" for offending the state.

The word Huaca is very interesting. Some historians say that it means Hua--from which, Ca--I come. Literally, that from which I come. The word has evolved to mean anything ancient in Peru: artifact, grave, pyramid, or just archaeological site. In 1964, on the Peruvian popular song hit parade, appeared a song whose title translates "Grave Robber, It's Sunday, so Let's Go Treasure Hunting." "Huaquero" is the name for someone that robs sites and graves, and these people have for centuries been obstacles to historians and archaeologists. There are valleys on the coast of Peru that from the air look like they have been bombed. The "Huaquero" so totally disrupts the site that it is impossible to study it scientifically. The Peruvian government gives heavy penalties for such activities.

It is estimated that the population of the Viru valley increased five-fold during the Florescent Period. Ask your students why. One of the major factors is, of course, the increased technology applied to agriculture, as well as the system of irrigation that connected the valleys and made them so productive. But the effective political structure which allowed greater productivity should be discussed. Ask your students who they think ran the irrigation systems. From studying the thousands of Mochica vessels that have been collected, it is clear that the Mochicans had a rigid political structure that controlled the irrigation systems, agricultural production, and crafts, and maintained legal courts and disciplined armies.

NAZCA:

As the students read the reading on the Nazca, they have been asked to make note of the similarities and differences between the Nazca Culture and the Mochica Culture. They should be able to name the following differences:

PERU

- (1) Nazca textiles, wood, basketry and featherwork have survived better, so we know more about them.
- (2) The pyramids of the north coast are much larger, as are the irrigation systems, the valleys, and the population densities.
- (3) The Nazca artifacts give no indication of fortification.
- (4) The warrior motif is not seen on Nazca pottery or in their textiles.
- (5) The trophy head, however, is very frequent in Nazca art.
- (6) The upper-class Nazcans are buried in vaults, not at the foot of the pyramids.
- (7) The Nazcans did not paint life scenes or mold portraits; instead, their pottery and textiles show a greater concern with religious and supernatural motifs. (Note: The strange "astronomical" lines have also been found in the Viru Valley but on a much smaller scale.)

When they have finished discussing the two cultures, they should notice that many of the differences are of magnitude: larger irrigation, populations, pyramids, etc. Possibly someone might suggest that because the northern valleys were larger, the resultant irrigation-agricultural complexes were larger. This is probably true, but remember that the militaristic nature of the Mochicans played an important role in subjugating the north coast. They were extremely well organized, as their public works testify.

After the discussion, show and discuss the following Slides:

Slides

Slide 122. Paracas mantle and detail. As was popular during the Paracas period, the center of the mantle is embroidered. The designs on this mantle are stylized cat "demons," some are right-side-up and some are up-side-down. The material is woven of cotton and llama wool. Usually these materials average over two hundred "weft" per inch (threads going one way per inch). Some have as high as five hundred threads per inch.

Slide 123. A close-up of one of the cat "demons." As you can see the figure is anthropomorphic. All are carrying trophy heads, some of the figures have human faces and others have a cat's face.

Slide 121. A close-up of the border of the mantle. It is painted rather than embroidered. This figure is also an anthropomorphized cat. This fragment has been preserved for 2000 years in a bone-dry vault on the Paracas Peninsula of the Pisco valley.

Slide 124. An example of a Paracas vessel. The spout is not stirrup shaped; instead, it is double. The stirrup-spouted vessel was a particular favorite of the Mochicans, not the Nazcans.

PERU

Slide 127. A typical Nazca vessel. The figure is an anthropomorphized fish. Does he seem to be carrying a trophy head?

Slide 129. Ask your students what they think this is and what it is made of. In the upper right hand corner is a face of an animal with a huge eye. There is a stripe running down from the eye. A tear? Perhaps. The design is made entirely of feathers. These feathers were brought into the coastal areas as trade from the tropical forests. The feathers were either cemented on or attached to yarn and stitched to the fabric row by row.

Transparency Project Transparency 142 on the screen. Use the overlays for the spread of Mochican and Mazcan influence. Note the correction on the transparency. It should read: Mochica culture 600 AD. Nazca culture 600 AD.

The first millennium appears to have been a general time of expansion in Peru. Ask your students to compare the Mochica and Nazca overlays. Ask them what they think was going on in the first millennium in Peru. Make sure they support their statements with data from the readings.

POINTS THEY MIGHT BRING OUT:

The north coast was very militaristic and probably expanded by using force and political pressure. We have seen so many warrior and war designs from the Mochica pottery.

The south coast of Peru experienced more of a cultural than territorial expansion, the Nazca culture dominating the Ica and Nazca Valleys. In this case, the natural environment was a check to expansion since the southern valleys are much smaller and support smaller populations.

The south coast was of a different cultural character from the north coast. The Nazcans appear to have been more concerned with the supernatural and religious than the Mochicans. Their art was freer and their designs included many more naturalistic animals and humans. The monumental architecture of the Mochica was absent. We can only speculate as to the reasons for this.

Your students may want to speculate as to the reasons for this different cultural character. One good question is why did the only true pre-Inca urban center (Chan Chan) appear on the north coast?

Was the Mochica militaristic nature a factor? In broader terms, is militarism necessary for the emergence of urban centers, or broader still, for the emergence of civilizations? Keep this question in mind for the last week on this unit. Later we will talk about some general theories for the development of civilizations. Think back to Sumerian civilization. Of what importance was militarism?

PERU

- 148 6. With this part on Tiahuanaco (pronounced Ti-wa-na-co) you will be using slides 128, 129, and 1180 and transparency 142.

Slides

Show your students Slide 128, which shows a full view of the "Gateway of the Sun." It now stands alone on the altiplano, uprooted from its original position as the entrance to the sunken court. The Gateway is probably eight feet high and is of fine workmanship. Slide 1180 is a close-up of the carving of the "Creator-God" and the so-called attending angels. Ask your students to point out as many features as possible about the figure and list them in the space provided. This single motif is so widely distributed in Peru that it has given important clues to the type of expansion experienced between 600 A.D. and 1000 A.D. Hopefully, we can point out some of the clues with the slides and reading.

Now show Slide 129, a featherwork mosaic. An eye (upper right) with a stripe or tear dominates this detail from an abstract design created with feathers. The tear is very common wherever the Tiahuanaco influence is found. It might interest your students that the "Creator-God" motif with a staff in his hand a tear streaking down his face is common in highland crafts even today. One can buy woven rugs in Quito, Ecuador, or Lima, Peru, with this design as the dominant feature. But if you ask the weaver what it represents, he shrugs and answers, "Quien sabe."--Who knows. The art form has been retained but not the meaning.

Transparency

Now project Tr. 142 using only the overlay for the Tiahuanaco influence. Ask your students what they think was the motivating force of the Tiahuanaco Expansion. Someone will probably suggest that because the figure of a God was spread over such a wide area that the expansion was religious in nature. This is probably true. Also, the expansion probably was political and aggressive as well.

Have your students read the article "Tiahuanaco: A Highland Ceremonial Center." Then the students may enter the data from their study of Tiahuanaco in the space for the Expansionist Period on their charts. They will want to leave some room at the top of this space for statements about Chimu culture.

Readings

?

To give your students some of the flavor and excitement of Tiahuanaco, you might want to read them the description of the site in Hans Baumann's Gold and Gods of Peru, pp. 142 through the first 4 lines on p. 154. (Note that the Gateway of the Sun is not 16,000 years old. A better guess would be 1600 years. And man did not originate here at Tiahuanaco. We learned earlier about man's coming to the New World.)

POINTS THAT SHOULD BE BROUGHT OUT:

The altiplano is not able to support large, concentrated populations. North of the 17th parallel (about where La Paz is located), agriculture is possible without irrigation, but south of the 17th irrigation is

PERU

essential. The average altitude of the altiplano is 13,000 to 14,000 feet. Only the potato, oca, and the hardy grain quinoa were cultivated. Corn will ripen at 12,800 feet but no higher. The altiplano population density probably has not changed much in the 1000 years since the Tiahuanaco site was flourishing.

It is very possible that a strong, aggressive religion carried the Tiahuanaco style over the extensive area depicted in Transparency 142. On the other hand, the impetus for the Tiahuanaco expansion could have been trade. Tiahuanaco styles could have moved across Peru as new trade routes developed and spread. As Tiahuanaco diffused into new regions, it did not destroy the existing styles. Instead, Tiahuanaco styles mixed and combined with the styles that had developed in each region, creating new styles in pottery, textiles, and metallurgy and perhaps new religions and governments. It has been suggested that the trend toward urbanization and large, well planned settlements was stimulated by Tiahuanaco dominations.

The overlay does not show Tiahuanaco influence in the Cuzco basin. However, newer evidence suggests that the early Inca may have experienced pressure from the expansion, also. The problem has not been resolved and is still under investigation.

Notes to the Teacher

Tiahuanaco is the name for an art style found over an extensive area of Ancient Peru and the name of a number of periods in Peruvian pre-history. After perhaps a thousand years of localized development in southeastern Peru and western Bolivia, the end of the first millennia A. D. witnessed the unification of most of Peru in the Tiahuanaco art style. The extent of Tiahuanaco influence at about 1000 A. D. is indicated on transparency 142, which is designed to show cultural expansions important in the formation of Peruvian, and finally, Inca, culture. The hatched area represents the spread of late classic and decadent Tiahuanaco which took place from 6000 A. D. to 1000 A. D.

The name Tiahuanaco has been given to the distinct artistic style by the archaeological site of that same name, where the style has been found in a very pure form, and where a long evolution of the style can be traced. Here an interesting set of remains termed Early Tiahuanaco have come to light as a possible forerunner of the widespread later classic and decadent forms. However, it is important to note that Tiahuanaco itself was not the only center of diffusion in the millennia preceding 1000 A. D. Strong influences passed from Tiahuanaco to other centers, such as the great walled highland city of Wari, which in turn radiated the Tiahuanaco style with an intensity revealing its original homeland.

The Tiahuanaco style appears to be the result of a regional development in the high "altiplano" around lake Titicaca. Early Tiahuanaco probably contributed to the development of the site at Tiahuanaco,

PERU

Bolivia, but the excavations show that the early site (the stratifications that underlie Classic Tiahuanaco) is remarkably unrelated to the Classic site. The early Tiahuanaco remains consist of dwelling site refuse rather than ceremonial structures. The refuse includes small clay buttons; stone polishers; hammerstones; pieces of slate, flint, obsidian, and quartz; a T-shaped stone ax; bone spatulas, needles, and points; and corroded fragments of copper.

Ninety-five per cent of the potsherds are from plain, undecorated ware. The characteristic Tiahuanaco "Creator-God" figure is not found; instead, the typical designs are a zig-zag linear design and puma heads. Furthermore, no building units have been correlated with this period (about 1 A.D.). Early Tiahuanaco has an extremely limited distribution. The Island of Titicaca is the only other place outside of the site of Tiahuanaco where early Tiahuanaco has been found in abundance. Early Tiahuanaco precedes Classic or Late Tiahuanaco but it is not necessarily its origin.

150

7. Ask your students to read "The Empire of Chimu" but not answer the questions yet. Show them the slides of Peru (See below.) and give them bare minimal clues as to what is pictured. Have them use their knowledge from the reading to tell you about what is pictured. Then you may give them additional data about the slides if you want to. Have them take notes about the slides in their manuals.

Now they should have the data they need to work on the questions in their manuals. You may want to divide the students into groups to discuss these questions or you may prefer to discuss them with the class as a whole. As the discussion proceeds, the students should take notes.

Then have your students summarize the data on the Empire of Chimu and put some statements on their chart. Note that much of the Chimu Empire was contemporaneous with the Inca Empire and so falls into the Imperialist Period.

Use the following slides:

1171--Chan Chan is located in the Moche Valley in northern Peru. These are ruins in the mouth of the valley, right next to the sea. Ask your students what they can delineate in the picture.

1174--Chan Chan also lies in ruins, but it is much larger than the ruins in the slide just shown. The ruins of Chan Chan cover an area of 11 square miles and the city is laid out in a very orderly fashion. There are 11 separate walled-in living quarters such as this one with outside walls over 20 feet high. (Some walls in the city are 40 feet high.) It has been hypothesized that each living sector housed a separate clan or kin group, each with its own head man.

1175--This is how the living quarters look when they have been reconstructed. It is a long, arduous task to carefully clean and repair the

PERU

the ancient walls, and replace bricks and designs that are missing without destroying any of the standing building. This particular building was possibly the home of a noble or a government building. A long ramp leads up to the entrance and the structure must have been very impressive. Note the decorated walls. The government of Peru is reconstructing a large portion of the city of Chan Chan in this same manner.

1176--This is a view of the side of the building in slide 1175. You can see that workmen are busily cleaning the wall and wheeling away the rubble that has fallen from the structure. Point out the decoration of the wall.

130--A close up of one of the designs used to decorate the walls of Chan Chan. The designs are cut into the paster or possibly produced with big stamps and molds. In order to expose the designs, the old adobe that has fallen around the walls must be carefully removed.

You may want to use the following illustrations in Peru by Bushnell when you talk about the Chimu:

Plate 57 shows a feather-work shirt or "poncho."

Plate 55 is a Stirrup-spouted blackware jar with a pressed relief of fish, pelicans, and a monkey near the spout.

Plate 56 is an air view of the Chimu fortress of Paramonga, the site of several battles between the Inca and the Chimu.

Plate 51 is an air view of part of Chan Chan.

Plate 58 is an llama-head bowl of the Chimu period.

CHAN CHAN - CITY OF THE CHIMU EMPIRE

We have come to the end of our brief story of Peruvian prehistory. We started the beginning of our story with a description of Huaca Prieta and the Early Farmers of Peru. The Chavin reading tried to bring the student closer to the Early Formative Period, with its dominant religion. The Regional Florescent Period with its technical and artistic developments was exemplified by the Mochica on the North Coast and the Nazca on the South Coast. We then look at one of the most puzzling periods of Peruvian prehistory, the Expansionist Period. Tiahuanaco's influence will be better understood as more archaeology is done. We do know, however, that it provided the impetus for urbanization and what we will look at now, The Imperialist Period, often called The City Builder Period.

Dr. Paul Kosok in his beautiful photographic study of the coast of Peru, Life, Land and Water in Ancient Peru, Long Island University Press, New York, 1965, surveyed twenty-five sites, most of them population and pyramid centers in the Moche Valley. Most of these sites have

PERU

never been excavated. They are either of the Regional Florescent Period or the Imperialist Period. Once these sites are excavated, we will know a lot more about the effects of the Tiahuanaco expansion and the emergence of urbanization.

In the Imperialist Period there were some changes in settlement pattern from previous periods. Chan Chan did not have a single pyramid within the city, but, instead, pyramids were built outside the walls of the city. Instead of dwellings surrounding a pyramid or temple structure, dwellings were built inside living compounds within the city walls. It has been suggested that each of the eleven compounds represents a kin group of some kind and the occurrence of a pyramid outside the city walls demonstrates the supremacy of secular power over religious power. The strong religious prominence of previous periods may have been thrown off with civil and secular authority emerging.

Dr. Kosok studied three ancient roads that connected Chan Chan with various parts of the empire. The most interesting of these seems to originate in Chan Chan and ends suddenly in the desert in two well built pillar-like constructions of stone. The highway is twenty-four yards wide and had walls of stone which originally had been six feet high. This highway was probably the royal entry into the Imperial City.

Dr. Kosok estimates that, at present, the Moche Valley has twenty-five thousand acres under cultivation. His studies of the canal system lead him to believe that the Valley may have had almost twice as many acres under cultivation in ancient times. In contrast, the neighboring Chicama Valley to the north, which is much larger and was also well irrigated, may have had a maximum cultivated area possibly triple that of the Moche, or 150,000 acres under cultivation. (Kosok, 1965, p. 88) Much of this land has today returned to desert. The Chimú practiced extensive agriculture, using fertilizer and probably rotating crops. They had the fully developed agricultural complex that they had inherited from their predecessors, the Mochica.

155



8. Show the film *The Incas* or another similar film, and discuss what the students have seen or have the students read "A Story of a Visit to the Last Inca, Titu Cusi" and answer the questions at the end. You will want to discuss these questions in class. If you use the film and not the article, be sure to bring out the importance of trade and the variety of arts and crafts in the Inca Empire. Note, too, that the Incas conquered other peoples and incorporated them in the Empire. Not all the Indians in the Inca Empire were Incas.

PERU

A STORY OF A VISIT TO THE LAST INCA, TITU CUSI*

The following translation of Don Diego Rodriguez' visit to the last Inca is of special interest because it is one of the few written eye witness accounts of an Inca court. Most of the chroniclers' reports are "secondary sources;" that is, second or often third hand accounts of Inca life. In Rodriguez' diary, however, we are reading his own descriptions of Titu Cusi, the last Inca who ruled over a tiny fraction of the original Empire while the Spaniards busily rebuilt the Inca capitol city of Cuzco.

Vitcos is perhaps seventy-five miles from Cuzco. Note that it took Rodriguez twelve days to reach Vitcos. The Pass of Panticalla, where Titu Cusi maintained a suspension bridge as the only entry to his sanctuary, is on the Lucumayo River, a small river in a deep gorge half-way between the Urubamba and the Apurimac Rivers.

Ollantaytambo is an impressive Inca fortress on the Urubamba River thirty miles northeast of Cuzco and between Machu Picchu and Cuzco. This fortress city guarded the road to the eastern jungles. It was only partially completed when the Spanish conquered Cuzco and Titu Cusi's father, Manco II, had attempted to complete it, but he was put to flight by the Spanish in 1537. Ollantaytambo was the site of many bloody battles and became very important to the Spanish for defense of Cuzco against the "renegades" in Vilcabamba, the last sanctuary of the Incas.

Many of the original stone houses at Ollantaytambo are occupied by peasants today.

A sketch of Ollantaytambo can be found on page 348 of The Conquest of Peru by William H. Prescott, a Mentor book.

-
9. After the students have seen and discussed the film The Incas and/or read and discussed the reading "A Visit to the Last Inca, Titu Cusi," assign the readings "The Inca Agricultural Calendar" and "Daily Labor" and the questions at the end of these readings. Note especially the close ties between religion and agricultural production, the social functions of daily labor, and the ways in which the peasant Indians were linked into the greater state structure.

162

Assign, also, four to six reports on other aspects of Inca life. Daily Life in Peru should be the basic source for these reports. Suggested topics for reports are the following:

- (1) the Inca substitute for writing, the quipu
- (2) communication and transportation (including roads, bridges, and messengers)
- (3) crafts

*If you are interested in following the story of Titu Cusi, it can be found in Lost City of the Inca, by Hiram Bingham, in part III, "The Story of the Last Four Incas," pp. 44 to 78.

PERU

- (4) architecture
- (5) the place of the Supreme Inca in Inca religion
- (6) how the realm was organized and administered
- (7) irrigation and terracing
- (8) how the important resource, the land, was distributed and worked so that all would have been enough
- (9) trade.

Pictures would be especially useful for topics 2, 3, 4, and 7. Check the reading list, National Geographic, etc. Parts of Daily Life in Peru which would be especially applicable for topics 6 through 8 are included in your manual. They may be lent to students. Be sure that they are returned.

If you assign topic 10, Trade, note that not everyone agrees with Mr. Baudin's usage and definition of foreign trade. The Inca Empire was so extensive from Quito to central Chile on the coast, in all of the Central Andes and into the jungle regions of the eastern slopes-- that foreign trade is difficult to define. Trade was carried on between the estimated eighty-five provinces of the Empire with great efficiency and was the monopoly of the state. There is one famous story of runners bringing the Inca fresh fish each day from the hatchery on the coast. The capital city of Cuzco, center of the Inca world, probably resembled a busy medieval European city. Therefore, one can argue with Mr. Baudin and his statement that the Incas had little "foreign" trade. It is true that they did not trade by sea but instead had an intricate system of roads. Also, it is remarkable that, even without wheeled vehicles, their contracts were so extensive. (Toy carts, and other wheeled toys have been found in grave goods, but Peru did not have draft animals to pull heavy carts as did the people of the Old World.)

Set a time limit on the reports and see that they do not exceed the limit. It is important that students learn to present important information clearly and concisely and not waste time with unimportant details. The students who are listening should take notes on the reports, for the data being presented will help "round out" their picture of life in Inca times. Allow about one class period for reports.

PERU

10. Ask your students to read the article titled "The Inca Empire When the Spanish Arrived." You may wish to tell the story of the fall of the Inca Empire or you may have a student who is a good story-teller who would like to tell the tale. The account may be found in any of the following books: 169

The Conquest of Peru by William H. Prescott, A Mentor paperback.

Fall of the Inca Empire by Philip A. Means.

Relation of the Discovery and Conquest of the Kingdom of Peru by Pedro Pizarro, translated and edited by P. A. Means, N. Y., 1921.

The Incas by Garcilasco de la Vega, edited by Alain Gheerbran, an Avon Library Book (New York: The Orion Press, 1961).

11. Ask your students to answer the six general questions regarding Inca culture. You may want to divide your students into groups of 5-6 students and let them share their ideas about answering the questions. Group reports may then be made and the ideas of all the students shared and consolidated in discussion. 170

The students may then fill in the top part of the Imperialist period on their charts.

Ask your students how they think Inca civilization came to be the way it was. How do they account for its development? Do they think it developed just like the civilization in Mesopotamia? Why or why not? (After studying about cultural development in Peru, they should realize that the two civilizations passed through similar stages in their development but they were not identical. They had different traditions and they developed in different environments. They had different resources to draw on in producing goods and services.) Also, the Inca civilization did not arrive in Cuzco in full glory from some unknown land or from across the sea. It was the culmination of a great deal of cultural growth and development throughout Peru.

12. Ask the students to write several paragraphs comparing some aspects of Inca culture with aspects of Sumerian culture. Note whether your students use political power, social patterns, or how the Sumerians and Incas used their limited resources to satisfy unlimited human wants as the bases for their comparisons. Then discuss the comparisons so the students can share ideas. (Or, you may want the students to work on the comparisons in groups.) Ask your students to explain any of the differences and similarities they can at this point. They should be aware that they lack a very important kind of data for Peru--about the physical environment. 172

PERU

173

13. Make sure that your students have finished filling in their charts for Peru. Discuss the charts with them, asking them to summarize the changes which took place. What were the developments in each period leading to these changes? Many of these developments may fall into the following categories: type of settlement, agriculture, industries, architecture, transportation, trade, social divisions, intellectual activity, warfare, and religion.

You may want to use the questions in the student manual to organize part of the class discussion. Have your students think about these questions overnight before you discuss them in class.

174

14. Ask your students to turn to their lists of criteria defining civilization which were compiled with reference to Mesopotamia. These criteria were compiled after studying only one civilization. Do they apply equally well to another civilization in a different part of the world? Discuss this question and have your students support what they say with examples from the data. Among other things your students should note that writing was present in Mesopotamia but not in Peru. The Incas did have a system of notation, however, --the quipu. How necessary was writing for the emergence of civilization?

Should every culture that is called a civilization possess all of the criteria used in defining civilization?

There are some criteria for civilization that have been compiled for Peru. At the end of "The Central Andes" by Donald Collier (in your manual) is a chart indicating some aspects of urbanism and the degree to which these aspects were present at various times in Peruvian prehistory. The criteria on this chart were in part derived from a listing of Childe's criteria. Also, G. S. H. Bushnell has stated some criteria for defining the civilizational level in Peru.¹

PERU

We used Childe's criteria for Mesopotamia without questioning them too much. Ask your students to look carefully at them now (and at other listings of criteria). How large and thickly populated must settlements be to be a part of civilization? How large is "large"? What was the beginning of science? How important is "important"? Didn't the site of Chavin show important art styles? Wasn't surplus food stored earlier than the Imperialist Period?

Your students will probably notice the vagueness of the criteria. And yet, since the criteria for civilizations (in general) must be applied to very different civilizations in different parts of the world, can any "firmer" criteria be at all useful? Ask your students to think about this. What might be some "firmer" criteria? Or are there any that wouldn't be too specific?

15. Reread the Teacher Background pages at the beginning of this Emergence of Civilization section. Ask your students to look horizontally across their charts and compare the cultural development in Mesopotamia and in Peru. What similarities and what differences do your students see in the two areas at approximately the same stage of development? There is a space for similarities and a space for differences at each general period or stage of development. 175

Now have your students utilize information on the charts they just made plus any additional information they need to write 300 to 500 word essays in which they discuss the following two questions:

Was the process of development the same for the cultures of Mesopotamia and Peru? Give specific examples to support your answer.

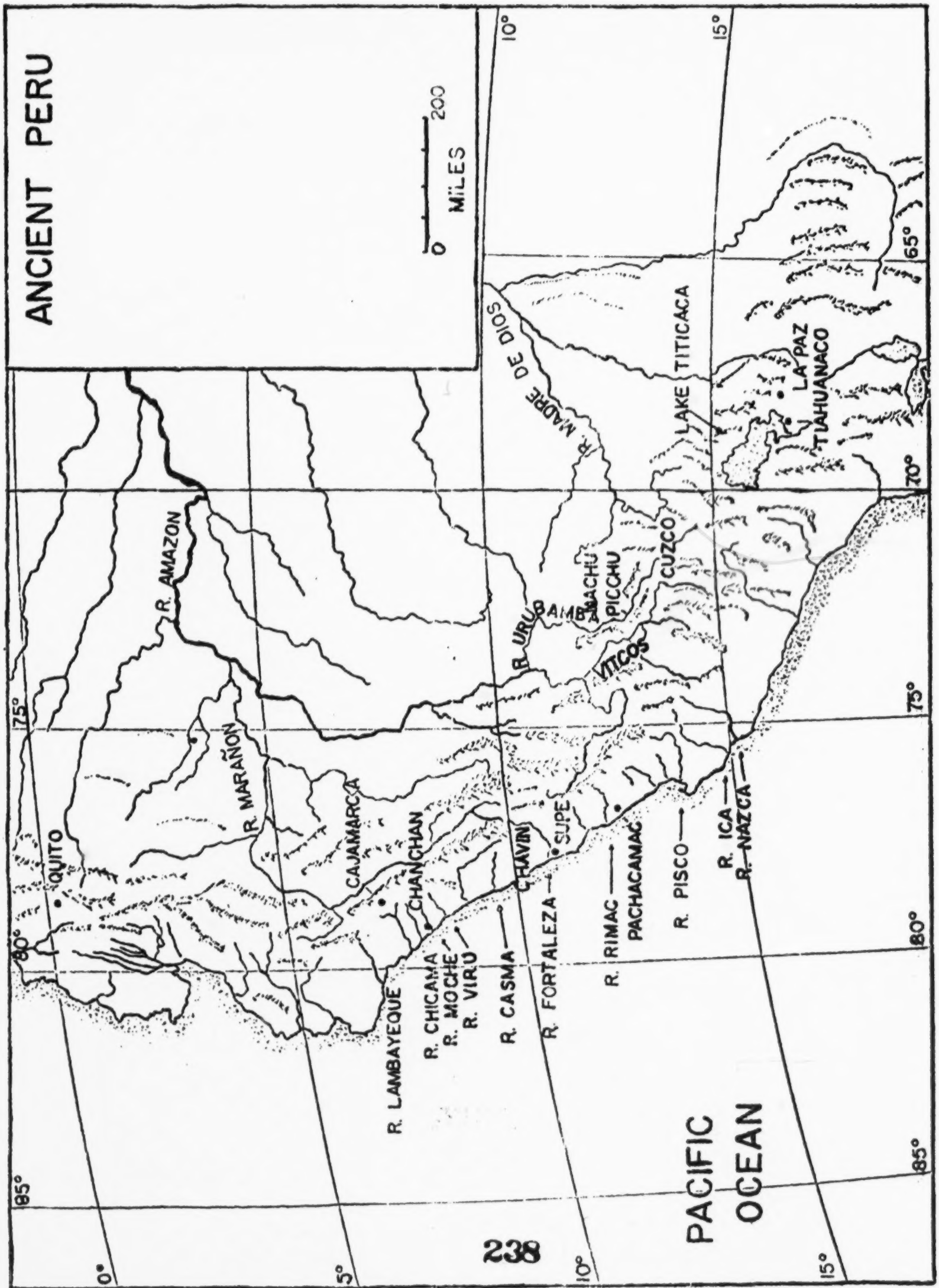
What general statements can you make about the process of development of civilization (not civilizations)? On what evidence are you basing your statements?

You will want to have several students read their essays in class and then have the class as a whole discuss the ideas in the essays. Do all

PERU

the students agree about answers to the questions? It is likely that they won't--this would lead to a more stimulating discussion, anyway.

Ask your students whether they feel the people in Mesopotamia and Peru were striving to develop civilization. They will probably realize that the civilizations "just came about," resulting from a number of factors. People didn't know that what they were doing was leading to civilization. They were just coping with their immediate problems. Are we today consciously striving to develop some new kind of civilization? Not really.



PERU

ANCIENT PERU

1. Your teacher will show you a transparency that points out another area of the world where an ancient civilization arose. From your studies in geography, what do you recall about the physical environments of this part of the world? Consider one aspect of the physical environment at a time. Record your ideas and observations as well as the important contributions of your classmates in the space below.

a. Landforms and Drainage -

b. Climate -

- c. Given the landforms and climate that you have discussed thus far, what type of vegetation would you find in this area? Check your answer as you view the transparency.

PERU

- d. What statements can you make about the soil that would likely be found in this area?

What do you think is necessary in order to have agriculture along the coast and in the highlands?

PERU

2. Read the following paragraph and note some other important aspects of the physical environment of Peru.

What summary statements can you now make that would be descriptive of the physical environment of the area of Ancient Peru?

Now consider the natural environment in relation to the emergence of a civilization. What opportunities does it present and what hardships does it impose?

PERU

3. AN EARLY FARMING VILLAGE IN PERU: HUACA PRIETA (2500 B.C. - 1200 B.C.)

What was an early farming village on the coast of Peru like? Did it resemble the farming village of Jarmo, Iraq (7000 B.C.)? If Huaca Prieta, which was inhabited over 4000 years ago, was a farming village, what crops were grown there?

As you will remember, the name Jarmo was given to that site by archaeologists. The name Huaca Prieta, on the other hand, was given to the site by the people living near it. The word "Huaca" refers to a mound or "something-associated-with-the-ancients" and the word "Prieta" means dark. The "dark mound" is a forty-five foot accumulation that has been undisturbed by "Huaqueros" over the centuries. The "Huaqueros" soon learned that this mound did not contain any of the valuable gold, textiles, or pottery that they were accustomed to plundering.

Most archaeologists today would give two golden vessels to find substantial evidence of early agriculture! They thus consider themselves fortunate to find early sites like Jarmo or Huaca Prieta that have remained undisturbed over the centuries. These sites offer very important clues about the beginnings of village life. In Peru, such early village sites often contain only bone and stone implements, gourds, and, of course, animal, plant, and human remains. Sites like Jarmo in the Old World and Huaca Prieta in the New World provide important information about the first permanent villages and the beginnings of agriculture.

Huaca Prieta is located at the mouth of the Chicama Valley. It is one of more than thirty preceramic sites known on the coast of Peru. These sites were either early farming or fishing villages or probably a combination of both--fishing villages that practiced simple agriculture or farming villages that relied on seafood for their protein. Interestingly enough, bones of land animals are rare at Huaca Prieta and very few hunting weapons have been found. There are a few bones of porpoises and sea lions, however.

Well-watered places near major rivers do not seem to have been generally preferred as living sites at this time. Perhaps the danger of flooding overshadowed the advantages. Most preceramic sites are near present or former marshes. Today, these desert sites would be the last places we would look for early village settlements. In most cases, however, investigation has shown traces of underground water which once may have been more abundant.

The Chicama Valley must have been quite different before it was settled by intensive agriculturalists. There must have been more swamp-land, lagoons, and wooded thickets, and a wider area devoted to marginal desert vegetation. Wild animals, birds, wild fruits, and other wild food plants were probably more abundant. From the remains in the midden (mound), it appears that subsistence depended heavily upon seafood.

Seafood alone, though, would not have supported Huaca Prieta's estimated population of 150 persons. Their diet also included several wild plants such as various roots (tubers), cattail roots, and fruits. It is

PERU

believed that they cultivated squash, a tuber called achira (which is like a big parsnip), lima beans, and chile peppers as well as cotton and gourds. However, there is no evidence for domesticated animals. Gourds were used as drinking vessels, as spoons, and as bowls, because the art of making ceramics was unknown to the first inhabitants of Huaca Prieta.

The early farmer-fishermen of the coast of Peru were very skillful in making textiles. They made fishing nets and rectangular cloaks of natural white and brown cotton. The designs on the cloaks were quite complex, a two headed snake being the most common motif. Blue dye or a red pigment were rubbed into the threads either before or after the garment was made. Feathers, which were obtained from the tropical regions inland, were often sewn into the cloaks for decoration. Were these worn only by a priestly class or an upper class? Or were the fine feather garments "dress-up clothes" for the common man? We cannot determine this from the archaeological evidence at Huaca Prieta.

One thing must be explained about the beautiful Peruvian cotton textiles of 4,000 years ago. They were not woven with a loom but, instead, they were twined. Two threads were twined together and knotted, and then another thread was stitched through these two with a bone needle. A series of these double twined threads going vertically and the stitched-in thread going horizontally produces almost the same effect as loom weaving. As time went by, however, loom weaving gradually made its appearance and replaced the "twining" technique. The latest level, dated 1200 B.C., contains loom woven textiles. Twined textiles disappear, never to be found again.

Houses

The people of Huaca Prieta experimented with several different types of houses over the 1300 years of occupation. Most of the structures appear to be late in the period. The most common type of house is a small, single room, commonly oval, subterranean house, though single room houses have also been found on the surface. The interior of the house was usually lined with the cobble stones and the house was roofed with wooden beams or whale-bones covered over with stones and mud. Other materials, such as the following, were also used for house construction: handfuls of hard, unshaped salene clay, large uncut stone for walls, and crudely-made rectangular mud bricks. Post holes indicate that houses were also constructed of canes and rushes.

Preceramic to Ceramic

Sometime before 1200 B.C., simple cooking pots were being used at Huaca Prieta. The vessels were irregular in color, being dull red to dark brown or black from a lack of oxygen in firing, and they were very simply decorated, the only decorations consisting of ribs or ridges made by pinching or notching the wet clay.

PERU

Why are we so concerned with the first appearance of pottery? Ceramic objects are certainly simple enough today to make. It seems to be the case, though, that whenever pottery first appears in the archaeological remains of a culture, a proliferation of new types of objects appear simultaneously or shortly thereafter. The many new objects suggest some type of "breakthrough" in technology. Most often this "breakthrough" is closely associated with the emergence of intensive cultivation of one or more surplus-producing crops.

After pottery makes its appearance in the strata of Huaca Prieta, a few cobs of low yielding corn appear. Much later, a different species of corn is found throughout Peru. It has been suggested that this high yield corn came south from Mexico. But there are people who disagree with this suggestion.

Religion

The last aspect of the life of the early farmers that we will consider is the development of their religion. In the Supe Valley there is a structure which may represent one of the earliest religious buildings in Peru. The building consists of a large room about twelve feet square which is connected by doors to two adjacent smaller rooms. The walls of this building are of uncut stone held together with mud plaster and are about three and a half feet in height. The floor is made of packed clay. In the center of the large room stands a platform about four and a half feet square and about twenty inches high. The platform is constructed from uncut boulders set on end with smaller stones filling in the spaces. The base of the platform is covered with mud plaster.

Pottery has not been found associated with this early religious center, but cobs of productive corn have been found. This serves to tell us that the site probably dated after 1200 B.C. Also, llama bones, presumably sacrifices, have been found near the altar. Llamas are not native to the coast, and thus they must have come from the highland either as trade, tribute, or captured booty. We have no way of knowing.

Burials also serve to tell us something about the early religious practices of the coastal farmers. The earliest burials at Huaca Prieta are flexed burials in shallow pits in the midst of refuse piles. However, later, abandoned subterranean houses and storage pits were used as burial grounds. The structure intended for graves was lined with cobble stones or adobe bricks and the body was bundled up and placed carefully in the grave. More grave goods were seen in the later burials--even a few ceramic figurines, as well as jet mirrors, shells, pottery roller stamps, and beads and weaving tools.

Some archaeologists view the appearance of corn and the great variety of grave objects found in the late (1200 B.C.) Early Farmer sites as an indication of the arrival of a new population. They argue that these people brought with them a productive variety of corn, better pottery, and the back-strap loom. We do not know the origin of these hypothetical late arrivals. Did they also bring with them a new religion?

We have no way of knowing what songs these early Peruvians sang or what jokes they told or even what prayers they prayed. None of these activities have left any traces. But we can guess that they used the mild

PERU

narcotic, "Coca," that is so popular in Peru today. At Huaca Prieta a small cord bag with a chewed quid, presumably of "Coca," was located in a burial. Today, a chewed quid of "Coca" is believed to be a cure for ailments such as kidney trouble and toothache. Possibly the chewed quid was placed in the grave of a sufferer of toothache or kidney trouble 4000 years ago, just as an Indian would place a chewed "Coca" quid in a relative's grave today.

3 (continued)

- a. What kinds of evidence do we have about life at Huaca Prieta? Are there any aspects of life at this period about which we have no information?
- b. What did the people of Huaca Prieta eat? How is this different from what the people of Jarmo ate?
- c. What were the buildings there like?
- d. What were some of the goods and services produced at Huaca Prieta?
- e. Compare life at Jarmo with life at Huaca Prieta. How were Jarmo and Huaca Pirta similar? How were they different?

PERU

4. A TRIP TO CHAVIN

If you were to visit Chavin, a 2500-year-old ceremonial center on the outskirts of the little village of Chavin, you would take the biweekly mail truck out of Huaras, Peru, and travel some five or six hours over a dirt road. The road cuts through a glaciated mountain pass at an altitude of about 15,000 ft. and passes through several valleys and villages before arriving at Chavin.

The trip would be very exciting and eventful, indeed. The mail truck is the only means of public transportation in this area; there are no busses to Chavin. Quechua-speaking Indians take their produce to various village markets via the mail truck, and when a village has a "fiesta," people from miles around stand patiently on the road in order to catch a ride on the truck. Even if you speak Spanish, you might not be able to talk to anyone during your journey to Chavin unless you speak Quechua also. You might even have to sit on stacks of sugar cane or bags of potatoes or defend your position against the many goats and sheep that will be in the truck with their Indian owners.

Arriving in Chavin, which is a small village in the fertile Mosna Valley, you will be able to find several people who speak Spanish. You will also be able to find a room and a place to eat. You will want to take sturdy boots and warm clothing since Chavin is at an altitude of about 10,200 ft. The noonday sun is intense here but the nights are very cool. Not many of the local people will be able to tell you much about the "Castillo," as the temple of Chavin is called. Although everyone will be able to direct you to the ruins, there is only one man in the village, Senor Marino Gonzales Moreno, who will be helpful in your exploration of Chavin. Dr. John H. Rowe, an archaeologist from the University of California, has dedicated a book to Sr. Gonzales called Chavin Art: An Inquiry into its Form and Meaning. Dr. Rowe calls Sr. Gonzales the "Savior of Chavin" as Sr. Gonzales has been very instrumental in the preservation and interpretation of Chavin. He has excavated and repaired the east facade of the temple, and he has assisted Dr. John Rowe in several "digs." He has found and preserved many of the stone sculptures that have made Chavin famous as well as acted as a guardian of the temple, helping to stop the vandalism of Chavin art. He has skillfully and carefully documented excavations, beginning in 1954. His efforts have thrown a flood of new light and understanding on Chavin.

Sr. Gonzales is a native of the town of Chavin. He speaks Spanish very well, but, of course, he speaks no English. He is one of six million Indians in Peru and Bolivia who speak Quechua or Aymara. He is an amateur archaeologist who is well respected by scholars all over the world for his work at Chavin. When someone arrives in this little village interested in the ancient ruins, he is a helpful, well informed, and enthusiastic guide.

Sr. Gonzales would be able to explain to you the overall plan of the site. The temple consists of three stories of rooms, galleries, and passages, and many of the rooms have never been excavated and cleared. Many are filled with dirt, stones, and the rubble that has accumulated since Chavin was a ceremonial center in 700 - 200 B.C.

When Sr. Gonzales shows you the temple, he will probably first take you to the east facade and show you the Black and White Portal which he excavated and repaired in 1955-1956. The south half of the portal is constructed of white granite

PERU

and the north half of black limestone. This is why it is called the Black and White Portal. We do not know whether the colors were of religious significance. As you see from the temple floor plan, the portal is the entrance to the second addition of the temple.

The enlarged south wing of the building was then treated as the main building. Why? Dr. Rowe suggests that this may reflect an increase in the importance of a deity which has originally been worshipped in the south wing. As this deity gained importance and influence, the "Great Image" deity probably lost influence. The image of the deity of the south wing has never been found. It probably was destroyed centuries ago.

Sr. Gonzales would lead you through one of the dark, narrow, stone passages, most of which measure three feet wide and six feet high, to the room of "The Great Image." "The Great Image" stands in the oldest section of the temple. It is one of the very few cult objects of Ancient Peruvian religion that can be seen in its original setting. The image is of white granite, about 14 feet 10 inches in height, carved in low relief to represent a human figure with his right hand raised. The size of this image and its setting in a dark passage give it an awesome quality. You will be glad Sr. Gonzales is with you! Although the "Great Image" is of human form, he has a great "smiling" jaguar mouth with two large tusk-like or fang-like teeth and he also has "snakey hair." You would be shown a slide of this "Smiling God."

You might ask yourself why the people of Chavin used the jaguar mouth and snakes for hair in their sculptures. Dr. Rowe has been puzzled over this question, also. He has come to some interesting conclusions after an intensive study of Chavin art.

Dr. Rowe suggests that the use of the jaguar mouth for a human mouth probably conveyed a special meaning to its viewers. The jaguar is legendary throughout tropical America for its courage and strength. The cat's mouth is found on figures of snakes, of human figures, of birds, and, in its natural context, on representations of all types of cats. The logic behind this is obscure. Perhaps the cat mouth is used to distinguish divine and mythological beings from ordinary creatures of the world of nature. The implication is that this is a comparison between the power of the jaguar and supernatural power. (Rowe, 1962, p. 16) Therefore, every time a worshipper came to the room of the "Great Image," he would understand the tremendous supernatural power and strength of the deity by looking at his powerful jaguar mouth.

Another illustration of this type of "message" in religious art that is readily understood by the viewer is the use of the halo to depict goodness and saintliness in Christian art. Anyone viewing a painting of the Virgin and Child understands what the halo over her head means and why the artist has painted it there. The same was true for the observer of the jaguar mouth in ancient Chavin art; he knew why it was carved and what it meant.

Two things you will want to bring to Chavin are carbon paper and large sheets of good quality paper. You are probably thinking "Good Heavens, what for?" Most of the art of Chavin is in the form of stone relief carving. You'll find, though, that by placing a large sheet of paper over a statue or carved cornice and rubbing

PERU

carefully with the carbon paper, you can produce a beautiful black and white reproduction of the statue. Sr. Gonzales will be very glad to help you. He knows where all of the interesting statues and relief carvings are.

Chavin was a ceremonial center but not an urban center. The small rooms of the temple would have made poor living quarters. However, the temple does have a well planned system of stone air vents measuring 16 inches by 18 inches that supply fresh air even to the lowest interior rooms. Along the edge of the river bank there is a row of six small cells, lined and covered with stones. Did ancient priests live here? Or, perhaps, priests lived in the few house constructions that have been found on top of the temple. No one knows. However, we can be sure that Chavin's population has not changed much over the centuries.

The many additions to the temple suggest that Chavin was built over a very long period of time by religious pilgrims. The changing styles found in the various additions give support to the idea that the temple was built floor by floor, addition by addition, over several hundred years.

Chavin style came to an end about 200 B.C., but we still know very little about the circumstances of this. We do know that the style had spread over a large area. The site of Chavin marks the southern limit in the sierra of the objects in the Chavin style that have so far been discovered. (The country south of Chavin is little known and may turn out to be full of Chavin sites!) The Chavin style has been traced as far as 250 air miles north and 250 air miles west. On the coast the style has been found from Curayucu, a little south of Lima, to as far north as the Lambayeque Valley.

Two other imposing temple sites have been found in the sierra, one called "Kuntur Wasi" at La Copa west of Cajamarca, and the other at Pacopampa in the northern part of the Lambayeque valley. On the coast there is a great Chavin temple a few miles north of Lima which is very similar to the one at Chavin. Any of these could have been the center of Chavin cultural influence, or the origin of the Chavin culture could still be undiscovered.

After 3 or 4 days in Chavin you would probably bid Sr. Gonzales goodbye and climb into the back of the mail truck. You will have to protect your carbon rubbings of Chavin art from the crush of Indians' sheep, goats, and sacks of produce on their way to market. Perhaps one day you will return to Peru and to ancient Chavin. There is still so much more to see!

Notes on Slides of Chavin

Slide 1181 shows the "Black and White Portal" at Chavin. A close-up of the carving on the columns is shown in Slide 1182. Slide 1183 shows one of the megalithic heads that adorn the temple facade. (The map with your reading points out the original position of the head.)

Slides 1184, 1185, and 1186 are all photographs of carbon rubbings taken at Chavin. The reading explains how rubbings are done. All of the rubbings are about 20 inches by 20 inches. Slide No. 1184 is a rubbing of the stone relief carving of the major diety at Chavin. Dr. John H. Rowe, of the University of California, has named this god "The Smiling God" because he thinks that he looks very cheerful! This diety is the same one that is depicted in the cult image that has been named "The Great Image." A full description of "The Great Image" is in the reading. The diety has the Jaguar mouth, snake hair, and claw feet that are so typical of Chavin art.

Slide 1185 is a photograph of a rubbing of a warrior; he is carrying a stone mace in one hand and in the other hand he is carrying a club in the form of a snake. Notice that he has a Jaguar mouth, and a cat's tail. Why do you think the artist chose to carve the warrior with these animal characteristics?

Slide No. 1186 is very interesting in that it is a more naturalistic carving of a Jaguar except for one feature. What is not naturalistic in the rubbing? Why do you suppose the artist put crab-like feet on a cat? The rubbing is interesting because it perhaps is an example of very early art at Chavin. Note that it is less complex and much more naturalistic.

(continued)

- a. Write below the primary attainments and attributes which mark Chavin culture.
- b. What kind of site was Chavin? Does this put any limitations on our data?

PERU

5. a. Your teacher will show you several slides. What inferences can you make about Mochica culture from looking at these slides?

Slide (1)

Slide (2)

- b. As you read about two Peruvian cultures in the Florescent Period, the Mochica and the Nazca, be watching for similarities and differences in the two cultures. Compare these two cultures below:

<u>Mochica</u>	<u>Nazca</u>

- c. Why do you think these similarities and differences exist?

PERU

Check the inferences you made in 5a. Were you correct?

- e. Your teacher will project a transparency which will show the spread of Mochican and Nazcan influence. Compare the area of influence of these two cultures. How do you explain the differences and similarities in spread of influence? What was going on at this time in Peru?
- f. How are these Florescent cultures different from earlier cultures in Peru?
- g. Does there seem to be a link between improved agriculture, increased population, and increased warfare? Explain.
- h. What summary statements can you make regarding the Florescent period in Peru? Fill in the section on your chart marked FLORESCENT period.

PERU

THE MOCHICA: A Culture in a Land Where it Never Rains

Mochica is the name of a language that was spoken by the Chimu people of the north coast of Peru, and today there are still some people on the north coast who remember a few words of the ancient language. The Chimu people lived during a period of Peruvian prehistory that is called the Regional Florescent Period. The word "florescent" indicates the flowering and perfecting of crafts such as ceramics, weaving, and metallurgy as well as the maturing of complex engineering and architecture. "Regional" is used to help us bear in mind that these developments took place in various different regions throughout Peru during the first five or six centuries A.D.

We will examine only two cultures of the Regional Florescent Period: the Mochica on the north coast and the Nazca on the south coast. These are only two of the many regions that experienced a rapid perfecting of aesthetic and utilitarian crafts. This perfection is exemplified in Mochican pottery and Nazcan textiles.

Mochican pottery is famous for the stirrup spout, realistically modeled, portrait vessels and for beautifully painted vases depicting every phase of Mochica life, including people and houses, farmers with their produce, judges passing sentences on prisoners, women giving birth, and beautifully arrayed warriors as well as conquered enemies.

The Mochicans were not only excellent craftsmen and engineers; they were excellent farmers as well. They not only dominated the rich river valleys but also brought marginal lands under cultivation by means of complicated irrigation systems. The canals in use in later times, including the aqueduct of Ascope, one of the master engineering works of ancient Peru, were probably built by the Mochicans. The Ascope aqueduct, located in the Chicama Valley, was fifty feet high and carried water across a dry ravine for almost a mile. The aqueduct had a cubic content of 785,000 cu. meters of earth and a weight of more than two million metric tons.

The domesticated llama, the alpaca, and the guinea pig were raised as food animals. The Mochicans were no exception to other early peoples in that they kept man's oldest friend, the dog, as a household pet. They also captured young deer, pumas, monkeys, and parrots in order to keep them as pets.

The total range of Central Andean domesticated plants was established by this period, and no new plants were added until the Spaniards arrived. The principal plants the Mochicans cultivated were corn, beans, peanuts, potatoes, yuca, sweet potatoes, hot peppers, pumpkins, coca, cotton, and many tropical fruits. They also cultivated various herbs that were used for medical purposes. It is interesting to note that several important crops--the potato, peanuts, yuca (sweet manioc), the sweet potato, and three other tubers are all root crops. The standard agricultural techniques included the use of the digging-stick, the hoe, and fertilizers, and all other specialized methods now known in the Central Andes were probably implemented by the

PERU

end of the period. Hunting appears to have been relegated to an upper-class sport, and food gathering did not play an important part in the economy. Fishing, however, continued as an important protein source, as it had been in Huaca Prieta and Chavin times.

It is estimated that the population of the Viru Valley increased five-fold during the Regional Florescent Period. One of the major factors was, of course, the increased technology applied to agriculture, including the system of irrigation that connected the valleys and made them so productive. Another factor was probably the effective political structure which allowed greater productivity. From studying the thousands of Mochica vessels that have been collected, it is clear that the Mochicans had a rigid political structure that controlled the irrigation systems, agricultural production, and crafts, and maintained legal courts and disciplined armies.

The Regional Florescent Period is generally characterized by construction of large public works, usually identified as temples or forts, canals, aqueducts and roads. One of the largest constructions of the period is "Huaca de la Luna" or pyramid of the moon, a step-sided platform, 275 by 200 feet, terraced against the side of a hill. The base served as a burial vault for priests and administrators. Nearby is a similar structure that is even larger. This is the "Huanca del Sol" or Pyramid of the Sun. Its base is 450 feet long by 750 feet wide. A step-sided pyramid 340 feet square and 75 feet high caps the platform. (Bennett and Bird, 1964, p. 120.)

Around the huge temple structures of Mochica times were growing the first large villages. Still held together by religious authority, the crowded Mochica people lacked real planned cities, but the basic ingredients for urbanization were present, and only a brief but strong stimulus from the far off South Highlands was necessary to bring about a full scale urban development. Keep this in mind as we look at the subsequent periods of Peruvian prehistory. The north coast, during the Mochica period, was "ripe", so to speak, for further cultural and technological developments. The period is characterized by the perfection of crafts, the mastery of hydraulic engineering, and the emergence of secular authority. We will now turn to the South Coast and discuss our other example of Regional Florescence in Peru.

PERU

THE SOUTH COAST: THE NAZCA CULTURE OF THE REGIONAL
FLORESCENT PERIOD

We have looked at the north coast cultural developments of the Regional Florescent Period. The north coast valleys are much larger than those of the south coast, and they supported larger cultivated areas and larger populations. The valleys of the south coast supported a cultural development similar to the Mochican in many ways but different in others. As you read, see if you can point out similarities and differences between the Mochica and the Nazca cultures.

The south coast is just as dry and in places dryer than the north coast. Fortunately for archaeologists, perishable items such as textiles, wood, featherwork, and basketry are preserved. In fact, at one ceremonial site called Cahuachi in the Nazca Valley, one group of rooms contained so many textiles that the archaeologists working on the site believe it to be an organized weavers workshop. One can almost think of it as an ancient textile mill, but, of course, all of the work was done by hand on the traditional back-strap loom.

This ceremonial center consists of at least six small pyramids, each associated with a court, the "ancient textile mill," and wattle-and-daub houses. The pyramids are natural hills which have terraces, steps, and adobe facings added. These small natural hill pyramids by no means compare with the huge pyramids of the sun and of the moon. The wattle-and-daub houses were built within the same area as the pyramids and the area was densely populated, although it was not yet an urban center.

The Nazca Culture flourished in the Nazca, Pisco, and Ica valleys and also in the smaller valleys to the south. The Nazca ruins and artifacts give little indication of fortification and aggressive expansion that have been discovered on north coast. The main motifs of Nazca pottery are anthropomorphic animals and deities (animals with human features or forms). Most common are centipede-like and feline figures and stylized designs of birds, fruits and fish. The "trophy head" is widely used as a motif, which suggests that human sacrifice and the taking of heads was practiced. The warrior, as seen on Mochica designs, does not appear in Nazca art.

Many such examples of design preferences come from textiles found at one of the largest cemeteries discovered on the south coast, Paracas Necropolis on the Paracas peninsula of the Pisco Valley. Forty or more elaborately wrapped mummy bundles were found in one of the stone-lined subterranean vaults. At another site, Cahuachi in the Nazca Valley, all of the larger graves were empty but the graves of poorer or middle-class people were untouched. Again the "Huaqueros" or grave robbers have deprived the archaeologists of some valuable information.

PERU

Unfortunately, the Nazcans did not paint life scenes on their pottery or mold portraits, buildings and activities on vessels, so we do not have the same information about their society as we do for the Mochicans. Instead, their pottery and textiles show a greater concern with religious and supernatural motifs. The pottery of the Nazca Valley is considered to be of excellent quality, while the Paracas textiles are considered among the finest in the world and exemplify the height of the art of weaving. Metallurgy, however, was not important on the south coast.

The irrigation systems of the south coast did not reach the same magnitude as those in north coast. There do not seem to have been inter-valley canals and aqueducts. The irrigation systems of the Nazca, Ica and Pisco valleys are smaller, less complex and maintain smaller areas of cultivated land. However, the crops grown were probably similar.

One of the most interesting aspects of Nazcan archaeology are the mysterious long straight lines, geometrical figures, and other markings on the ground that one can observe from the air. These markings were formed by removing the dark brown pebbles which cover the yellow sandy surface in this neighborhood. By piling them up, the exposed areas reveal patterns and designs some of which are over five thousand feet long. Some of the patterns take the form of birds and fish; others are spirals or zigzags. Radio-carbon dates for a post at the intersection of two lines indicate that some of these patterns date from about 500 A. D. What significance do these strange shapes have? One of the best explanations offered so far is that the lines were used for making astronomical observations for calendrical purposes. Another suggestion is that the lines and figures were for celestial gods to view. Whatever the explanation, the execution of such a mammoth undertaking required a large organized labor force. These patterns remain one of the most interesting mysteries of Peru's ancient history.

One might say that the Nazca culture, also, was "ripe" for a new influence from the south highlands. This new influence came in what has been termed the period of Tiahuanaco expansion, which we shall call the Expansionist Period. This is one of the most important periods in Peruvian prehistory.

PERU

6. Tiahuanaco: A Highland Ceremonial Center 600 to 1000 A.C.

The "altiplano" of Peru and Bolivia stretches cold and barren around Lake Titicaca at an altitude of 12,000 to 14,000 feet. Adequate rainfall in the immediate vicinity and north of Lake Titicaca permits cultivation without irrigation. (La Paz, Bolivia has an annual rainfall of twenty-two inches. However, some form of irrigation is necessary south of the lake because the rainfall steadily decreases as one approaches northern Chile.) The high altitudes present other problems for agriculturalists, though. Corn and wheat will ripen at an altitude of 12,000 ft. but no higher. The hardy potato, a root called oca, and a very hardy grain native to Peru called quinoa are the only crops the Aymara Indians grew before the Spanish conquest. However, the bunch grass that grows at very high altitudes (at 13,000 feet and above) is seen on the high plain and provided the major source of pasture for the herds of alpacas and llamas.

Small round adobe houses dot the high plain in a scattered pattern. The population density probably has not changed very much since pre-Hispanic times. Many of the simple adobe houses have stone foundations, and if one were to inspect the individual stones closely, some of the well cut stones would give clues to the ancient past of the Aymara people who live around Lake Titicaca. For centuries the Aymaras have been robbing an ancient ceremonial site called Tiahuanaco of its stones to construct their simple houses.

The Aymara people can tell us very little of the ancient builders of Tiahuanaco, which is one of the most impressive stone masonry complexes in Peru. In fact, archaeologists cannot tell us much about the origin of Tiahuanaco, either. We must wait for more archaeological study to be done in the area. The stones lie scattered around the site mutely testifying to a people extremely skillful in architecture and stone masonry. The stone work of Tiahuanaco excels even the excellent masonry of the Incas. The stones are well cut, notched, and polished. Copper clamps were set into cut out grooves to join the stones. Natural copper is found around the shores of Lake Titicaca. The ancient builders did not have to extract it from other ores; they only had to cast it into the desired shapes. The only other places that natural copper is found in the New World is around the shores of Lake Michigan.

Stone sculpture is very frequent at Tiahuanaco, including pillar-like statues (one of which is about 24 ft. tall), relief slabs and blocks, and decorative friezes on gateway. Also, both animal and human heads with tenons or blocks for wall insertion are found. The dominant motif which typifies the Tiahuanaco Classic Period is the central figure on the "Gateway of the Sun." The figure is of a human with a staff in each hand, a belt with dangling trophy heads around his waist, and large tear-like marks streaking down his face. It has been suggested by several anthropologists that the figure represents a Creator-God. The gateway originally led to a great sunken court, 195 feet by 210 feet in size. The court was once enclosed by stone walls. Huge stone columns, which once supported the walls, now lie scattered about the site. The sunken court, the walls around it, and other buildings at Tiahuanaco were made of cut and polished sandstone and basalt. Neither of these materials is immediately available at the site. The nearest source of sandstone is three miles away. Many of the stones at the site weigh as much as one hundred tons!

PERU

A natural mound at Tiahuanaco was stone faced and terraced to a height of fifty feet, making a pyramid whose base measures 690 feet by 690 feet. The top of the pyramid served as a reservoir with a stone overflow and canal. House foundations have also been found on top of the mound.

Many of the carvings as well as buildings stand unfinished. The construction of Tiahuanaco was probably done intermittently over several hundred years. It is believed that Tiahuanaco was a great ceremonial center where people came several times a year to worship and to work on the construction of the buildings, the carvings and the courts. This is the explanation offered for the great number of unfinished carvings and buildings.

Other artifacts such as wood, bone, textiles, and feather work have not preserved well on the relatively rainy altiplano (as compared with the preservation on the dry coast). No textiles have been found but the statues give us a fair picture of the clothing of the day. Depicted are decorated head bands, waist bands, ponchos, and other articles of clothing. As in other parts of the world where preservation is poor, stone and pottery offer the most clues to the archaeologist. The pottery of Tiahuanaco is usually decorated with a painted portrayal of the "Creator-God," feline designs, snakes, and birds.

The dominant style of the "Creator-God" is found on almost the entire coast of Ancient Peru. Often the style is found fused or mixed with the local art styles, but aspects of Tiahuanaco such as figures with tear-like streaks on their faces and the rigid human figures of the God are very frequent in coastal textiles and pottery. However, the monolithic stone architecture typical of Tiahuanaco has not been uncovered on the coast. This spread of Tiahuanaco style is called the Tiahuanaco Expansion and is dated between 600 A.D. and 1000 A.D. The exact nature of this expansion has not been determined. But, because components of the Tiahuanaco complex are so widely distributed and so readily recognizable, some form of political expansion is certain.

Not all areas of ancient Peru fell under Tiahuanaco influence. The far north coast and the far north highlands probably were not affected. The unity under Tiahuanaco was relatively short lived, and soon reformulations of both Tiahuanaco and the local styles emerged in new mixed forms. Many of these reformulations resulted in the large urban centers. Tiahuanaco provided the stimuli necessary for urbanization to emerge.

PERU

7. The Empire of Chimu

The last epoch of Peruvian prehistory we are going to discuss is what has been called the Imperialist Period. The period is generally dated from 1000 A. D. to the arrival of the Spanish in 1532 A. D. The two greatest empires of the period are the Chimu Empire of the north coast and the Inca. The period marks the time in Andean prehistory when true urbanization appeared with such cities as Chan Chan on the north Coast and Cuzco in the Inca Empire. Chan Chan was the capital of the Chimu Empire and it was conquered by the Inca only sixty or seventy years before the Spanish arrived. The Chimu territory, just before it was conquered by the Inca, extended six hundred miles from the modern boundary of Peru and Ecuador, south almost to Lima. But when the Spanish arrived, they found a Chimu chief living in the capital city of Chan Chan with only a handful of people. The Spanish were impressed, as are visitors today, by the city's immense size. Chan Chan, the largest pre-Hispanic urban center known, could truly be called a metropolitan city. It covers eleven square miles, and, in 1450 A. D., when it was conquered by the Incas, it had an estimated population of 50,000 people.

The city was divided into eleven huge living compounds, each surrounded by walls twenty-five feet high. Most of the walls are still standing but the buildings have become heaps of adobe rubble. These buildings were once administrative centers, dwellings, huge store-houses, and palaces. The city of Chan Chan was well planned and laid out in an orderly fashion. The eleven living compounds were almost identical in design. All are rectangular units, containing planned groups of dwellings enclosed in massive walls. Some of the buildings are more elaborate with richly decorated walls as well as courts and mounds. These elaborate buildings are believed to have been used by the ruling class and the cult centers.

Chan Chan is located in the Moche Valley which, as you will remember, we called, "The Land Where it Never Rains." For a city of some 50,000 people to live in this dry, rainless country, the effective use of the water supply was all important. The city was supplied with water by an intricate system of canals and aqueducts. One, the Mochica Canal, is still in use. The La Cumbre Canal is estimated to have been seventy-five miles long and brought water from the headwaters of the Chicama River to the fields of Chan Chan. The system of canals and aqueducts transformed the desert into a fertile, productive land. Chan Chan was supplied with food by the many irrigated fields surrounding it. Near the fields and the major canals and aqueducts were small towns. The people of these settlements worked the fields, maintained the canals, and transported produce to the capital city.

When we discussed the ancestors of the Chimu, the Mochicans, we said they did not have organized, planned towns. In the four hundred years of the Expansionist Period, however, a strong organizing and urbanizing influence came from the south highlands and affected the entire coast. There is a break in the art styles of the north coast between the Mochica culture (200-600 A. D.) and the Chimu (about 1200 A. D. to about 1460 A. D.). There is also a gap in time of some five or six hundred years. During this time Tiahuanaco influence can be seen in pottery; weaving and metallurgy. Also with the Tiahuanaco expansion came the necessary social organization that made urbanization possible.

PERU

Chan Chan, during its height in the fourteenth century, probably resembled a large urban center of the Old World of the same period. There were differences, of course. Transportation was primarily by human carriers as the wheel had not been invented in the New World and the llama will only carry a maximum load of about sixty-five pounds. The market would have been different, also. People, of course, would have been speaking the Chimu language and they would have been dressed quite differently. Also, the produce for trade would have been entirely different, potatoes, yucca, corn, squash, beans, and chile peppers would have been the main items. For meat, there would have been fish, guinea pigs, and maybe a little game. Wheat, barley, sheep, goats, and cattle, of course, were unknown until the Spanish arrived. The Chan Chan market would have had great quantities of goods produced in the area: textiles, pottery, and, especially, metal objects. The Chimu had perfected means of mass production; for example, they turned out great quantities of pottery by using molds. The mold-made pottery was polished redware or commonly smoked blackware with the stirrup-spout as the dominant shape. Painting was rare, but decoration was achieved by modeling, pressed relief, or incision (cutting designs into the pot before it is fired).

Woven fabrics were produced in quantity, also, but the elaborate weaving of previous periods was less frequent. Sheer gauze-like material, brocades, and pattern weaves were abundant. Embroidery was common but it was applied to limited areas or to figure outline. Border fringes were typical although needle knitting, which was practiced by previous cultures, had been abandoned. Elaborate feather work was typical, too.

Metal work is the one craft that was more technically advanced in this period. Many of the other crafts experienced a decline in both popularity and excellence. Bronze, or the alloy of tin and copper, was known, and the casting of copper became widespread for the first time. Gold, silver, copper, and bronze were all used in making such ornaments as masks, earrings, beads, crowns, and breastplates. Goblets, bowls, and plates were made of silver and gold, also. Fine incised design work was popular for all of these luxury items for the nobility as well as intricate mosaic insets of beads, seeds or stones. If we wanted to name the one craft that the Chimu developed to excellence, improving on the techniques that they inherited from their ancestors, the Mochicans, it would have to be metallurgy.

After the conquest of the Chimu, the Incas so highly prized Chimu craftsmen that they moved several to Cuzco to work gold, copper, bronze, and silver, to make pottery, and to weave for the royal court. In fact, quantity production is what characterizes all the crafts of this period.

We can only guess that the Incas learned many other things from the Chimu besides new techniques of metallurgy. They could have learned new governmental and ruling techniques from these sophisticated urbanites as well. Whatever they learned, the Incas considered Chan Chan too powerful to let it remain intact. It is speculated that they depopulated Chan Chan and destroyed many of the nearby towns. A great number of the cultivated fields reverted back to desert waste and the magnificent city of Chan Chan began to crumble. Sixty years after the conquest the Spaniards found the region sparsely populated and fallen into ruin. It has never returned to its original magnificence.

PERU

- a. Your teacher will show you some slides. What is pictured in these slides? What additional data do the slides give us about the Empire of Chimu?

Slide (1)

Slide (2)

Slide (3)

Slide (4)

Slide (5)

PERU

- b. Think very carefully about the following questions. How would you answer them?

Is the city of Chan Chan different from cities in earlier periods in Peru?
How is it different?

How is the city of Chan Chan similar to or different from a Third Dynasty city in Mesopotamia? How are they similar to or different from a modern American city?

What were some of the crafts developed to excellence by the Chimu?

PERU

What effects do you think mass production had on the Chimu economy?

List what you think were the primary resources available to the Chimu people. In what ways did the Chimu improve their use of available resources over the ways earlier cultures had used their resources?

What can you say about Chimu social life and political structure? How are these similar to or different from earlier Peruvian cultures?

PERU

The reading is taken from Hiram Bingham's account of his 1911 discovery of Machu Picchu. Mr. Bingham believed that he had discovered the last royal city of the Inca, the capital city of Vilcabamba. But Machu Picchu appears to have been only a small fortress town of no more than 150 structures designed to guard the valley that led into the Eastern jungles. It is very likely that it was abandoned shortly after the Spanish conquest. The archaeological remains do not indicate that it was the lost capital city. It was known that Titu Cusi had a fair sized army, many captured horses, guns, suits of armor as well as a city of considerable size. Machu Picchu could only have been a town of some three or four hundred at the very most, and, oddly enough, the burials contained mostly skeletons of females. Very few males were buried at Machu Picchu. The "Lost City" of the Inca is still undiscovered; it is, perhaps, somewhere under the thick jungle growth of the eastern slopes of the Andes.

Answer the following questions pertaining to the reading "A Story of a Visit to the Last Inca, Titu Cusi."

- a. What indicates to you that the Inca was a very important man? Describe below.

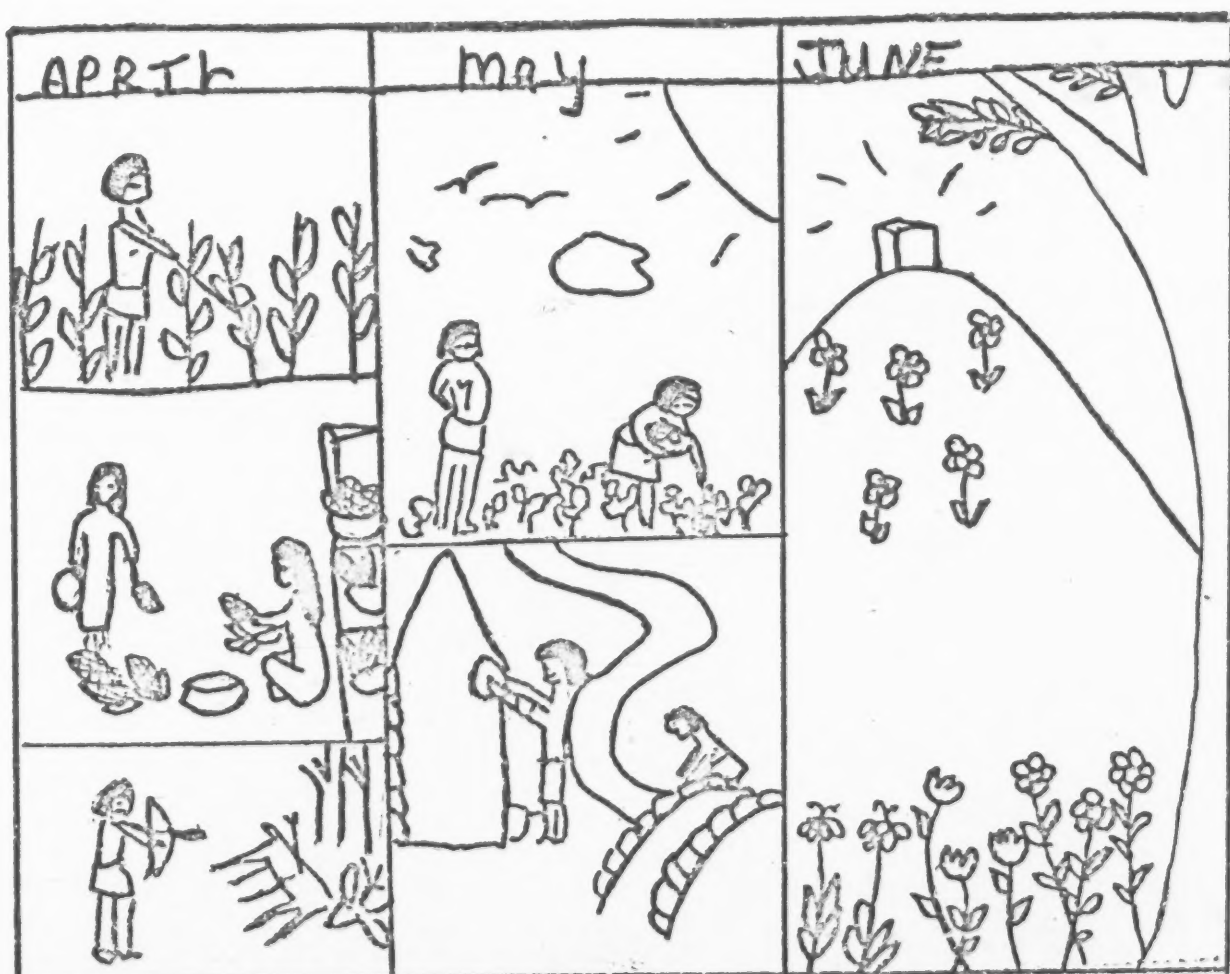
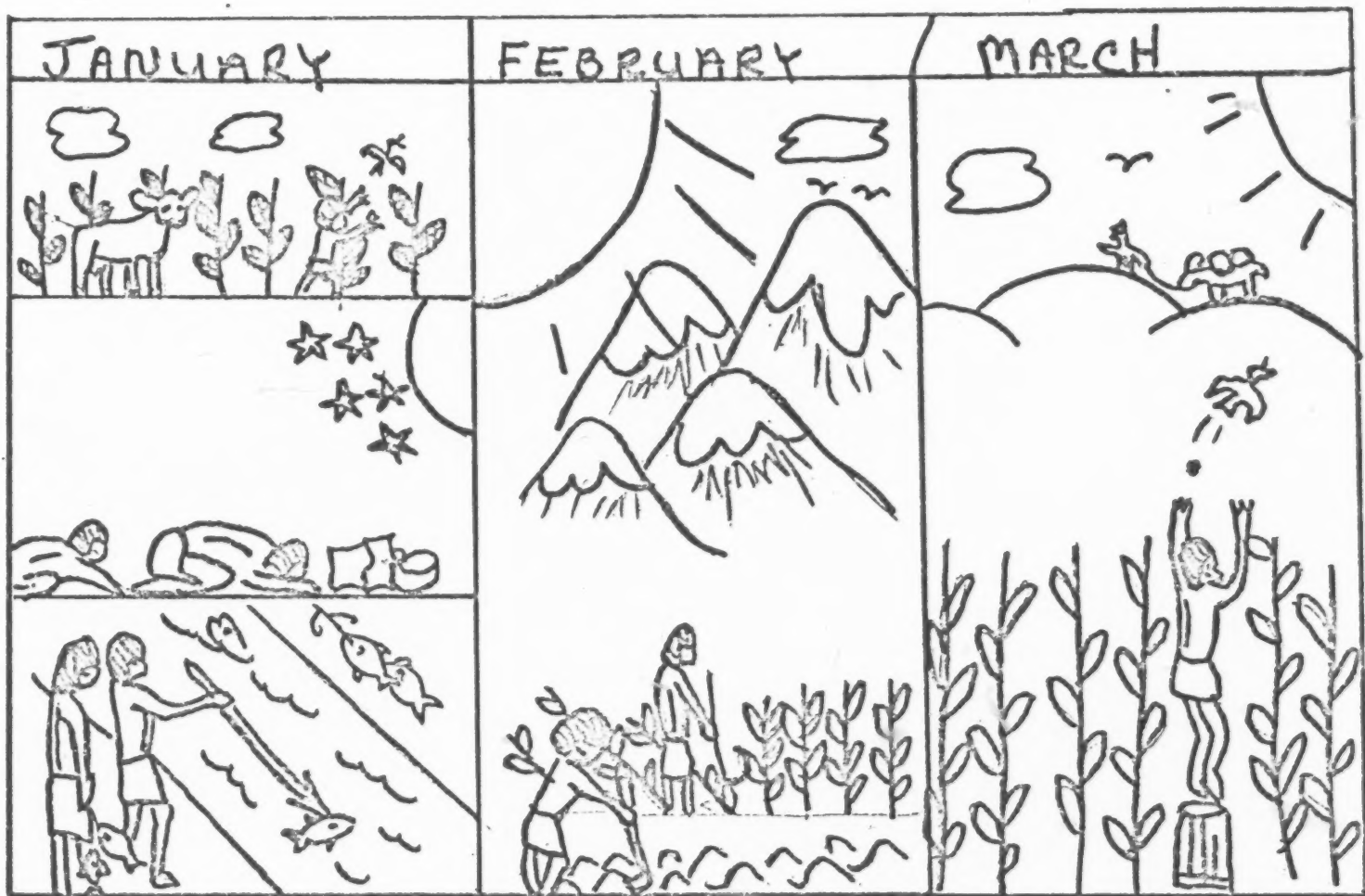
- b. List the arts and crafts that were present in the Inca Empire. Beside each one you list, indicate the word or words in the article which gave you the clue.

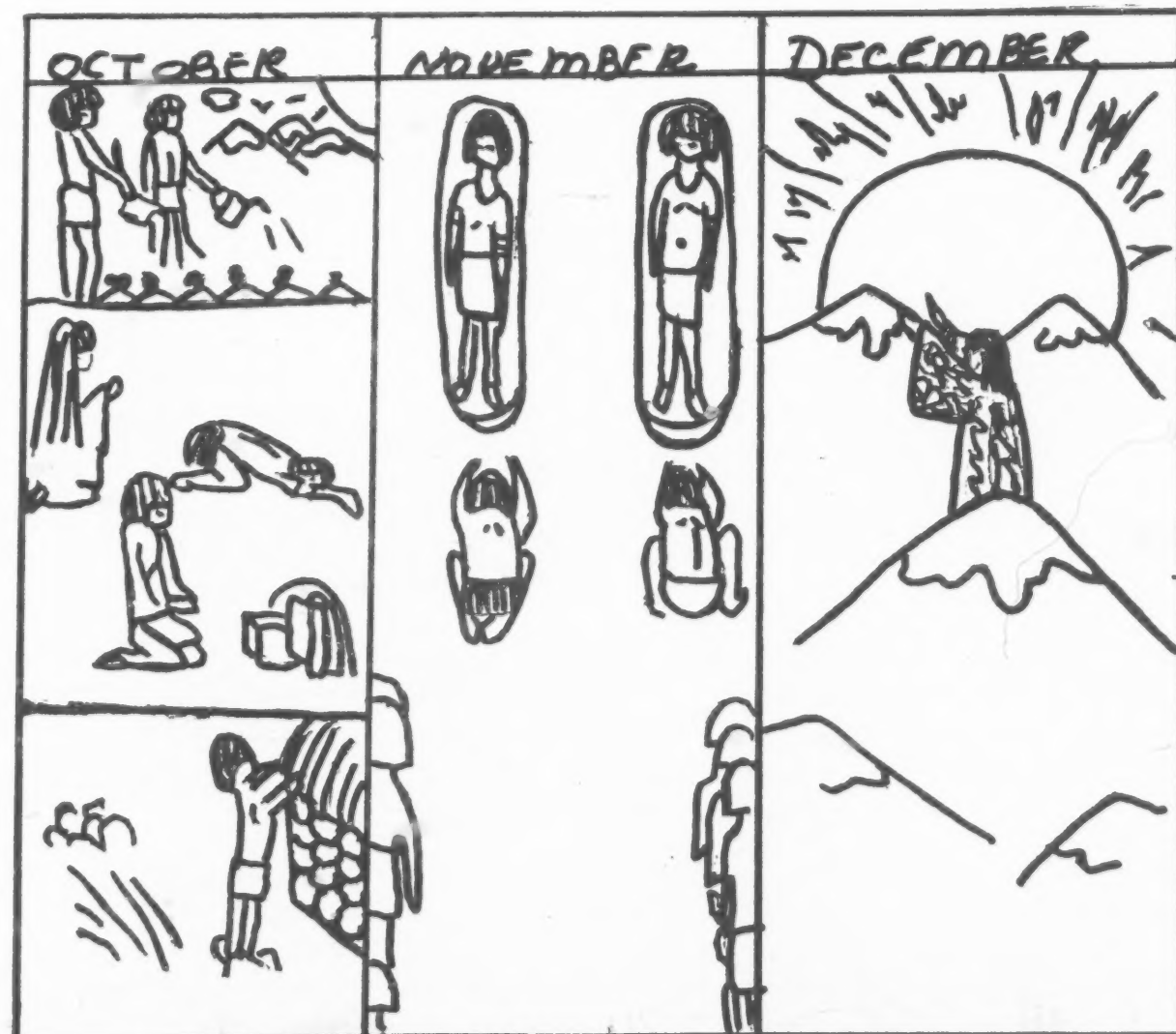
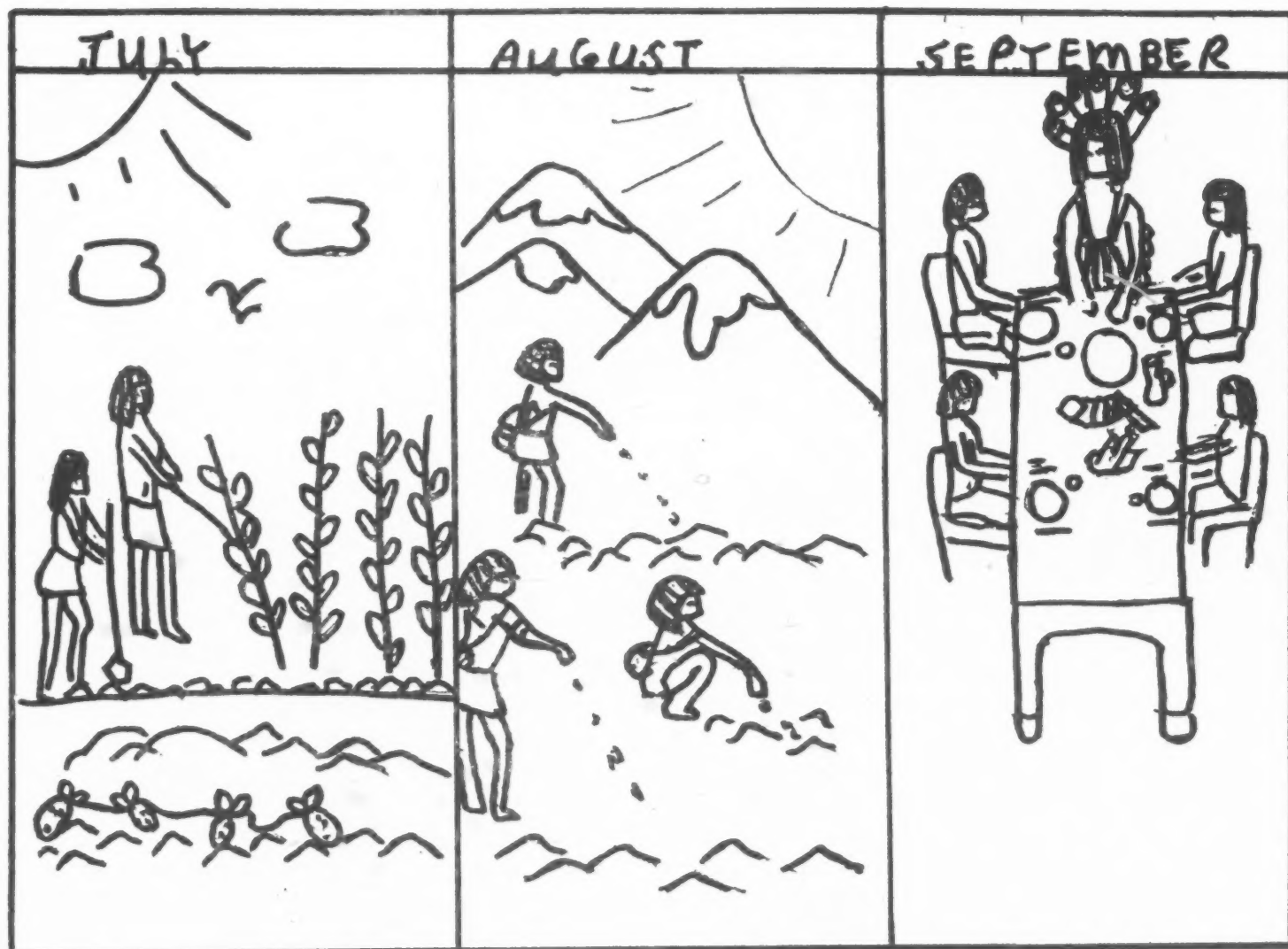
Arts and Crafts

Clues

- c. What foods were served? Where (geographically) did these foods come from?

THE INCA CALENDAR





PERU

Daily Labor

Let us imagine ourselves in the days of the Incas and follow the Indian as he sets out to work one fine morning in July. An immutable order provided that the lands of the Inca and the Sun came before all others. Nothing could be more just. That day, at dawn, a trumpeter climbed the slopes of the hill overlooking the village and blew into his conch shell to call the inhabitants together. They all came, with their wives, gathered in their family groups, spade on shoulder and wearing holiday clothes. To serve the god of light or his representative on earth was not work, it was a pleasure. Everyone knew, moreover, that the Emperor himself each year at this time went to the field of Kolkampata, sacred to the worship of the Sun, and ploughed the soil in homage to his creator.

Once the little party had arrived, officials divided the tasks amongst the group leaders, and they amongst their individual members, assigning to each of them a long and narrow strip of land so that the leader had only to move backwards in a straight line and all the other men in the group followed parallel to him. This system, like that of sharing portions between the members of the community, had the advantage of fixing responsibility. He who finished first did not help the others, 'otherwise,' explains a legal expert, 'they would have done nothing.' In fact, no one finished before or after the others, for the Indians placed themselves in line, each on his strip of land, with his wife in front of him. They began to sing in chorus and worked back evenly in line, matching the rhythm of their actions to the song. The refrain which regulated the general speed was 'victory'--haylli--victory over nature, over evil spirits, over famine and death.

The instrument of toil was a very simple tool which was used to turn the earth, the taklla, a piece of hard wood slightly more than 3 feet long, having, in Ecuador, a groove towards the centre so that the left hand could more easily hold it. In Peru a second piece of hard wood, bent round, was bound near the centre. This was held by the right hand whilst the left held the first piece of wood upright. In both models, just above the tapering end, were fixed two small crossed sticks on which the worker placed the right foot to drive the stake into the ground like a spade. However this was considered to be inferior to the taklla, for it dug out large lumps of soil, whilst the taklla crumbled it. Poma de Ayala shows a delightful drawing of Adam digging with a taklla.

To till the soil, the Indian lifted this tool and drove it with all his strength into the ground, then he leaned on it with his foot and added the pressure of his arms backwards and forwards so as to break up the soil. His wife picked up the stones and broke up the sod with a large stone. The tilling took the form of a series of holes into which the seed was thrown, and there was no continuous furrow. After making a series of these broken parallel lines, the group of workers dug another series of identical lines at right angles to the first.

Instead of two people, there were sometimes three, two men and a woman, so as to break the soil up more deeply. The presence of the woman had not only an economic but a magical significance. The earth was considered to be feminine, she was the foster-mother, and Indian women were supposed to be in closer contact with her than their fathers or husbands.

Tools varied according to the country. The Araucans used a taklla, shaped like a trident, and a perforated stone attached to the handle gave it extra weight. In the Chiloe islands, two Indians operated a tool, one drove it into the ground, the other raised the embedded point with a stake, thus levering up a huge sod.

PERU

For earthing up potatoes, the farmer used a bronze adze with a curved wooden handle.

After working on the lands of the Inca and the Sun, the Indians prepared the land of those who were unable to work on their own, of whom we have already spoken. For this they wore their working clothes and were supervised by their officials. But when they finally came to their own plots, they worked as they pleased. They always began by carefully marking out their domain, placing stones or planting cactus; then they decided the order they would follow in carrying out the work.

To watch over their fields, they had a very practical arrangement; they put certain stones in charge. Since everything on earth was living, especially beneficent rocks fulfilled this mission best. They were called huancas, and they survive to this day in a few places. At Piruro, in the province of Huanuco, a block of stone has been from time immemorial the guardian of the fields, and also of the animals which it protects from the thunderbolt. To win favour, the Indians adorn the rock with wild flowers and water it with chicha. The existence of these silent sentinels, unexacting and alleged to be efficient, was recorded by the Spanish missionaries in their search for idols.

-
- a. What crops did the Indians in the highlands grow?
 - b. How did the religion of the people fit in with their agricultural tasks? Why did they feel religion was important to the successful growth of their crops? Give examples.

PERU

c. Do you think the daily labor served any functions besides providing for the need for food? What?

d. What kinds of tools did the Indians use?

e. What evidences did you find in the readings of the national government taking an interest in the Indians and what they were doing?

PERU

10. What happened to the Incas when the Spanish came? Read and find out.

THE INCA EMPIRE WHEN THE SPANISH ARRIVED

The Inca Empire was at its zenith for ninety years between 1442 and 1532. During this period the Inca conquered and controlled a land area approximately the size of two Texas. Population estimates for the Pre-Spanish Central Andes range from three to six million. It is interesting to note that the first Spanish census taken in about 1571 gives a total of 1,500,000 Indians. This may indicate that the population of Peru was reduced by either a two-to-one or a four-to-one ratio during the years of struggle.

The Incas ruled over possibly as many as eighty-five provinces where as many as seven hundred dialects were listed by early chroniclers. Three languages have survived and are spoken today in the Central Andes: Quechua (which was the official language of the Empire), Aymara, and Uru. Today there are an estimated six million Indians in Peru and Bolivia who speak Quechua and Aymara. It is difficult to estimate how many different languages were spoken in the Andes during the height of the Inca Period, but twenty to thirty distinct languages would be a conservative guess.

Each time a province was conquered a rough census was taken and a relief map was made of clay. If a newly conquered province became rebellious, part of the population was moved to a new locality where they were placed under Inca administrators. In this manner the Incas colonized new areas and disrupted the old political systems of the people they conquered. The Inca ruling house also married into newly conquered ruling families. They often sent the sons of conquered kings to Cuzco for a proper Inca education. After growing up in Cuzco, the sons usually returned to their provinces loyal Inca subjects and administrators.

The Incas perpetrated what has become to be known in history as "The Great Lie" of the Inca Empire. Once they had conquered a region, the subjugated people were taught that the Supreme Inca was the Son of the Sun and therefore a god. The Sun in turn served the great God, the Creator, who had created the Inca people as his chosen people. The Incas believed and taught that before they were created, there was no other civilization in the world. They viewed their conquest of the barbarous world as the will of their Creator-god.

Usually a propaganda campaign pointing out the benefits of Inca rule preceded any military action and missionaries attempted to make converts for official Sun worship. If these measures proved unsuccessful, the army entered in mass formations of eight to ten thousand soldiers and conquered by siege, cutting off supplies, destroying water canals, and staging expertly led pitched battles. The army was well organized and discipline was severe. It is estimated that one-tenth of the population was in the army.

Chance played a major role in the conquest of Peru. Francisco Pizarro and his band of one hundred and seventy-seven soldiers of fortune reached Peruvian shores just as the Inca Empire was being torn apart by civil war. The Inca ruler had died without naming an heir to the throne and his two eldest sons were engaged in a bitter struggle for control of the vast Empire. The Spanish arrived at the most opportune moment in history. The Empire had fallen into a state of disorder and confusion, and governmental administration had broken down in many regions.

PERU

The Spaniards seized the opportunity to play one brother against the other by promising to aid both sides! The conquest of Peru was accomplished with the deaths of both of the Inca brothers. Francisco Pizarro placed a weak, young Inca ruler on the throne, and so began another era in the history of Peru.

11. Answer the following questions, illustrating your answers with examples from the data:

a. What were some of the goods and services that were produced in Peru in Inca times? What resources were used in producing them?

b. Where was power placed in Inca society? How was authority enforced?

c. What can you say about Inca society?

PERU

- d. How did the Incas transmit ideas and transactions to fellow Incas, to the people with whom they came in contact, and to subsequent generations? What is your evidence?

- e. What can you say about the Inca value system? Be specific, and give examples.

- f. What do you think were the major achievements of the Incas? List the attributes and accomplishments which mark Inca culture as a civilization.

PERU

12. Write several paragraphs comparing some aspect(s) of Inca culture with aspect(s) of Sumerian culture.

How do you explain the differences and similarities between the two ways of life?

PERU

13. Finish filling in the Peru part of your chart. Then, looking at the charts, answer the following questions:
- a. What changes do you note in settlement patterns from Huaca Prieta to Cuzco? Why do you think these changes came about?
 - b. What changes came about in patterns of leadership? Why did they occur?
 - c. When did distinct social classes develop? How do you think they came about?
 - d. In what order did the various industries come into being? Why do you think they are in this order?

PERU

- e. What changes were there in the quality and quantity of goods and services produced? How do you explain these changes?
 - f. Do you note any changes in other aspects of culture? What?
14. Turn to the criteria you compiled for civilization in Mesopotamia. Do these apply equally well to civilization in Peru?

PERU

15. Turn to your chart. Looking horizontally across the chart, what similarities and differences do you note in Peru and Mesopotamia at approximately the same stage of development?

	Similarities	Differences
Mesopotamia Peru		
Sumer Imperialist		
Early Dynastic Expansionist		
Proto-Literate Florescent		
Ubaid Formative		
Village farmers Early farmers		

THEORIES

Introduction and Teacher Background

Part 3 - Theories About the Emergence of Civilization

BIBLIOGRAPHY

RACE

Brace, C. L. and M. F. Ashley Montagu Man's Evolution (New York: The Macmillan Company, 1965).

Chapter Nine in this book describes some of the difficulties in delineating races and then discusses traits that have traditionally been used for defining races. It would provide a good introduction to the topic of race.

*Dunn, L. C. and Theodosius Dobzhansky Heredity, Race and Society (A Mentor Book, 1958).

This book deals primarily with heredity in general but also contains a chapter on race. Some of the history of ideas of race is discussed and various typologies of races are examined. Difficulties in using the concept of race are discussed. This is one of the best overall explanations of what is meant by race.

Coon, Carleton S. The Origin of Races (New York: Alfred A. Knopf, 1962).

This book contains a great deal of data on both prehistoric and historic races. Carleton Coon has classified all the peoples of the world into five major races.

Garn, Stanley M. Human Races (Springfield, Illinois: Charles C. Thomas, Publisher, 1961).

Human Races is an attempt to describe the mechanisms of racial differentiation in man and to describe what race is. It presents a typology of nine races.

*Dobzhansky, Theodosius. Mankind Evolving (New Haven and London: Yale University Press, 1962).

This textbook contains an excellent section on the concept of race. It is probably the most complete discussion of race of all the references on this bibliography.

THEORIES

Introduction and Teacher Background

PHYSICAL ENVIRONMENT THEORY

Forde, C. Daryll. Habitat, Economy and Society (New York: E. P. Dutton and Co., Inc., 1961).

In this book are case studies showing relationships of various cultures to their physical environments. You will want to read the introduction to this book if you can before discussing the Physical Environment Theory with your students.

IRRIGATION THEORY

Wittfogel, Karl A. Oriental Despotism: A Comparative Study of Total Power (New Haven: Yale University Press, 1957).

Ideas in this book provided the basis for the Irrigation Theory of civilizational development. Chapter One is particularly relevant to our consideration of the importance of irrigation.

JULIAN STEWARD THEORY

Steward, Julian H. Theory of Culture Change (Urbana: University of Illinois Press, 1963).

The basic ideas of the Multilinear Theory of Evolution, formulated by Julian Steward, are contained within this book. His conception of "levels of sociocultural integration" is also clarified and illustrated with examples.

THEORIES

Introduction and Teacher Background

TEACHER BACKGROUND

Thinking About the Growth of Civilization

By now students have had a chance to think about how they might explain the emergence of civilization. They are ready to make another, quite difficult, step toward understanding that process. Our purposes now are:

1. To establish that no one single cause is responsible for the development of civilization;
2. To deepen the students' perception of the regularities in the emergence of civilization;
3. To clarify the multiple line interpretation of the development of civilization.

It is clear, from these three goals that the concluding section is based on the work the students have done up to this point. In the preceding section they have found and compared stages of development and characteristics common to two early civilizations. They have not been asked any "why" questions such as:

Why did civilization develop?

What caused civilization to develop?

Although such questions are stimulated by the nature and subject of the text, they are not part of the concern of this unit. Such apparently simple, forthright questions, it would seem, ought properly to be the ones to be considered. But such questions are deceptive in their seeming simplicity and forthrightness. Such questions as "Why did civilization emerge?" were asked by the early archaeologists during the times when men thought that prime causes and first principles were ascertainable by an examination of apparent effects. Fortunately for the development of social science--but unfortunately for our peace of mind--archaeologists are now concerned with tracing the lines of development within the early civilizations. In other words, archaeologists are more concerned at this time with understanding the processes of the development (the how of cultural development) of the early civilizations. They have stopped for the present trying to apply any particular philosophy to explain why the civilizations did develop. This subtle change in purpose reflects the change in the historical context in which archaeologists now work. This is not to suggest that archaeologists would not like to know why civilization emerged. But it is now generally believed that there is no single cause for the emergence, and furthermore, that if causes are discernable, they are inextricable from the developmental process itself. That is why the process must be studied at more and more profound levels. We shall begin with two single cause theories for the emergence of civilization. These theories, though discredited, can be useful tools. Your students should show the inadequacy of the theories themselves. These two theories are the racial theory and the physical environment theory.

THEORIES

Introduction and Teacher Background

The racial theory can probably be demolished fairly easily. Both the wide racial diversity of the earliest civilizations and modern biological knowledge disprove it. There are no superior races. You will want to consider the topic of race with your students while discussing the theory. Note the books on the bibliography which discuss race.

Physical environment as the prime cause for the emergence of civilization is more difficult to disprove. The natural physical environment does put some limitations on cultural development but it does not determine what that development will be like. Ask your students to glance through their notes for a few moments to find out what physical environmental features are common to both civilizations studied (and to any others which were reported on). They should discover that civilization arose in a wide variety of physical environments. There are some conditions common to all the places where early civilizations developed, however. One of these conditions is the availability of water; another is tillable soil, etc. There is a difference between important or necessary conditions and causes or prime factors, however. The availability of water did not cause civilization to develop. Civilization did not develop in every place where water was available.

The third theory we shall consider is the irrigation theory. If you can get it, you may want to look at the book Oriental Despotism by Karl Wittfogel. Review, also, what Robert Brăidwood has to say about the irrigation theory in The Near East and the Foundations for Civilization. The irrigation theory emphasizes the importance of a series of technical, social, and political activities, though it still focuses on one primary cause. There is not enough evidence however, to support the assumption that all the early civilizations used irrigation. Also, in those civilizations for which there is evidence of irrigation, the evidence does not show that civilization developed as a result of irrigation. There seems to be some evidence that large-scale irrigation was possible only after the appearance of centralized authority and other characteristics commonly associated with civilization. In other words, effective, large-scale irrigation came after the emergence of civilization. Or, at least, large scale irrigation developed along with the development of civilization, but not before it.

If the preceding work has been successful, you should have rooted out your students' inclination to cling to a simple explanation for the emergence of civilization. They should be wondering whether the question "Why did civilization emerge?" can even be answered.

The last theory we shall consider is the Steward theory.* This theory describes the how of cultural development rather than trying to answer the why. There are two important concepts in understanding this theory. One of these is "multilinear evolution" and the other is "levels of sociocultural integration." The first concept refers to the many lines of cultural development in the world. The other concept is more difficult and is thus not dealt with directly in the student reading. If your students are interested, though, you may want to present some outlines of the concept to them.

*See Steward, Julian H. Theory of Culture Change.

THEORIES

Introduction and Teacher Background

The concept "levels of sociocultural integration" refers to a number of qualitatively different kinds of developmental levels which may occur in social and cultural systems. These levels occur cross-culturally with great regularity and result from ecological adaptations which can vary only within minor limits. Some of the levels which Dr. Steward has described are the family level, the patrilineal band, and the composit hunting band.

THEORIES

RECOMMENDED TIME TO SPEND WITH THIS PART OF SECTION V: 2 days

1. Ask your students why civilizations developed. What caused them to develop? Write their responses on the board. Send a copy of this listing to SSCSC. Some responses in the past to these questions were the following:

the growth of population
people wanting more and better things (goods and services)
trade and sharing of ideas
opportunities in the physical environment
strong desire on the part of the people to keep pushing
 ahead and cooperate
special abilities of the people.

Let your students bring out as many ideas about these questions as they can.

Now proceed with discussion. Keep in mind that we want:

1. To establish that no one single cause is responsible for the development of civilization;
2. To deepen the students' perception of the regularities in the emergence of civilization;
3. To clarify the multiple line interpretation of the development of civilization.

Start with the responses that would lead to a belief that civilization developed because of special desire on the part of a group of people. Did the people consciously want to develop civilization? Probably not. Did only the people who lived in cultures in which civilization was developing want more and better things? No, all people want this. Then how can this be a cause for the emergence of civilization?

Now ask your students to turn to "Racial Genius Caused Civilizations to Develop." This article presents the case for racial genius being the causative factor in the emergence of civilizations. Have your students read the article and write down or discuss their ideas about it. Then pass out to them and have them read the article beginning "Modern scientific research. . ." Ask these questions:

1. Having finished reading the preceding article, do you see anything wrong with the Racial Theory for the Emergence of Civilizations? What?
2. Why do you think this theory has been held by people for many, many centuries and continues to be held by some people today?

Ask them to check what they wrote in 2b. Were they right?

THEORIES

Question 2 would provide an excellent lead-in to the whole topic of prejudice. Peoples all over the world are prejudiced against other peoples; prejudice is not just something that occurs in our country. We are specifically concerned here with racial prejudice. Ask your students whether racial prejudice is present in our country today. Perhaps they can give some examples of it. To understand racial prejudice, we need to understand the nature of race. Note the listing of books dealing with race in the bibliography at the beginning of this section. Bear in mind that skin color is not the only criterion for defining races--there are many others. Also, a listing of races is a typology. The "cake" of man's physical variations may be "cut up" into any number of "pieces" (races).

- 177 2. The Racial Theory is not adequate to explain cultural development, but what about the Physical Environment Theory? Ask your students to look through their notes on the physical environments of Mesopotamia and Peru. What physical environmental features are common to both civilizations studied? Follow the same procedure you followed with regard to the Racial Theory. Also, refer to the Teacher Background pages at the beginning of this section.

Your students may have more difficulty in seeing why this theory is inadequate than they had with the Racial Theory. You may want to call their attention to the word "caused" in the article "Favorable Physical Environments Caused Civilizations to Develop." Be sure that your students understand the difference between necessary conditions and causes or prime factors. Also, make sure they understand that the environment is a limiting rather than a determining factor in cultural development.

- 178 3. Another theory that has been postulated as explaining why civilizations developed is the Irrigation Theory. Ask your students to read about this theory (4a) and to answer questions 4b, c, and d. Discuss with them their answers to these questions. Your students should perceive that this theory is more complex than the other two theories which have been considered. This theory deals with a series of technical, social, and political activities. Do not press your students for answers to 4d, but do have them state some of their ideas. Ask them to read 4e. What is wrong with this theory? Your students should be beginning to perceive that the question "Why did civilizations develop?" cannot really be answered without getting into teleology. It would be better to ask "How did civilizations develop?" (Note that this is the question dealt with in the last theory to be considered.)

- 180 5. This is the last theory which we shall consider. It is really not a theory but a point of view. You may want to look at the book Theory of Culture Change if you can get it before you discuss this theory with your students.

THEORIES

Ask your students to read the article and answer the question. Discuss the question in class. Your students should understand that the question why cannot really be answered except philosophically or theologically. In their consideration of the emergence of civilizations they have been studying the how all along.

6. As a capstone to the whole unit, ask your students to write 500 word essays on "Man's Cultural Development." In this essay they may focus on any aspect of cultural development that they feel is important. It will be interesting to see what your students consider most important. The topic is a broad one and if your students note this, it will indicate that they have at least learned something from the unit. The essays will necessarily be summarizing and general, though do encourage your students to use concrete examples when they can.

You will want to have your students read and discuss some of the essays in class.

SEND THE BEST OF THESE ESSAYS TO SSCSC

THEORIES

1. RACIAL GENIUS CAUSED CIVILIZATIONS TO DEVELOP

Today there are peoples in the world such as the Australian aborigines and the African Bushmen who still practice a hunting and gathering way of life. Most Eskimos were hunters and gatherers until recently. But there are also peoples in the world who have the technological know-how to build skyscrapers, produce enormous food surpluses, and send rockets to the moon. Why did some peoples develop civilization but not others?

There must have been some inherent characteristics of certain races that enabled these races but not others to develop civilization. Two of these inherited characteristics must have been greater energy and greater intelligence. The superior races, then, developed civilization and the inferior races didn't. Even when inferior races lived in favorable environments, they couldn't develop civilization because they lacked the genius of more favored races. The only way inferior races might have been able to obtain some aspects of civilization would have been to adopt them from other more gifted races.

- b. What do you think about this theory? Is it accurate or not? Why do you think so?

2. FAVORABLE PHYSICAL ENVIRONMENTS CAUSED CIVILIZATIONS TO DEVELOP

The physical environment was the principal factor in the development of civilization. The early civilizations arose in particularly favorable environments where food and water were readily available and the soils were fertile. The relationships of the developing cultures with these favorable environments led to a better and better use of the resources in the environments, and so these good environments caused civilizations to develop.

- c. What do you think about this theory? Is it accurate or not? Why do you think so?

THEORIES

3. Read the following article describing the Irrigation Theory for the development of civilization.

THE DEVELOPMENT OF LARGE-SCALE IRRIGATION
SYSTEMS CAUSED CIVILIZATIONS TO DEVELOP

The development of complex, large-scale irrigation systems had repercussions in the technical, social, and economic spheres that caused civilizations to develop. The largest and most important systems of irrigation coincide with the greatest densities of population, the most important urban areas, and the centers of political power and military expansion. Why might this be the case?

Water appears unevenly in the landscape. In some areas there is little rainfall but the soils would be good for farming if only water could be brought to them. Farmers in these areas had to secure reliable sources of water, and so they discovered and turned to irrigation to do this.

Irrigation farming naturally requires more effort than simple rainfall farming. Small, local tasks related to irrigating may be done by a single man or family or a small group of neighbors, but complex, large-scale irrigation projects can only be done by large groups of people. In Egypt, for instance, water must be diverted from the Nile and made to flow into a network of shallow irrigation canals. The canals must first be dug and then periodically cleaned and maintained. Banks of earth or dikes have to be built to keep the canals from flooding. A lot of people are needed to keep this complex system of irrigation in operating order.

These large groups of people must work cooperatively in order to get the work done. There need to be leaders to coordinate the work and central planning to organize it. The sheer scope of the tasks necessary to manipulate a large amount of water demands centralized leadership.

In the resulting irrigated fields, farmers can grow more crops. This encourages them to accept leaders, who are supported by the surplus food so they can withdraw from farming and take up the leadership tasks. These leaders may also have ceremonial duties, keeping the gods happy so the harvest will be large. Gradually, the irrigation systems become larger and larger and extend over more and more territory. Authority becomes more centralized and leaders possess more power and wealth and their influence is felt throughout the land. Great palaces and temples can be built. The result was that:

"The hydraulic agriculturalists outgrew and outfought the majority of all neighboring peoples wherever local conditions and international circumstances one-sidedly favored an agro-managerial economy and statecraft."¹

1. p. 19. Karl A. Wittfogel. Oriental Despotism: A Comparative Study of Total Power. New Haven: Yale University Press, 1959.

THEORIES

1. On the Racial Theory

Modern scientific research indicates that there are probably no significant differences in physical and mental abilities between racial groups. Peoples who use plows are not necessarily more intelligent than those who don't; they just had the opportunity to learn how to use them. Theoretically, any item of knowledge can be transmitted to and acquired by any race of people anywhere in the world. "Actually, the range of variation in ability among the members within any one racial group is greater than the differences in ability between any of the racial groups."¹

Civilization was not developed by any one race but by several different races. There is no such thing as one superior race developing civilization. Civilization developed independently in the Old World and the New World. Remember the transparency showing the loci of the world's oldest civilizations? The inhabitants of Mesopotamia and Middle America were certainly not members of the same race.

It is true, too, that cultural energy seems to come in spurts. The same group of people may show a great deal of inventiveness and ability at some times in their history but not at others. Roman civilization rose but it also fell.

The racial theory does not explain why civilizations develop, though some people still believe in it and try to use it to justify their prejudices. (For instance, weren't some of the atrocities in Hitler's Germany committed because people believed the Aryan racial stock was superior?)

1. p. 1. Thinking about the Growth of Civilization: New Evidence and New Understanding. Copyright © 1964, Anthropology Curriculum Study Project, 5632 Kimbark Avenue, Chicago, Illinois 60637.

THEORIES

2. On the Physical Environment Theory

There is an intimate relation between the resources and conditions of the physical world and human activities. There are differences in climates, vegetations, etc., that lead men to follow different activities in different parts of the world. But do they always follow different activities? The men of Camp Century were still living in accord with American culture even though they were living in Greenland, weren't they? In this case the same activities were being carried on in different environments.

And how about the converse? It is true that similar environments haven't always led to similar developments in man's way of life. Sharply contrasted ways of life may be found side-by-side.

Between human activity and the physical environment are cultural patterns and traditions. A society living in a favorable environment for agriculture wouldn't grow crops if they never knew about growing them. Favorable physical environments for the development of civilization existed in many areas of the earth, and yet civilization only emerged in a few of them.

Particular characteristics of civilizations, though, are very much affected by their physical environments. For example, we have seen that the animals available to be domesticated in the New World were not good draft animals. So the wheel for transportation was not used in the New World. The primary grains available for domestication in Mesopotamia were wheat and barley, so they became staples there instead of corn, which was available in the New World. (Considering our grain preferences, from which early civilization is American civilization derived?) Environmental factors are very influential in the development of each civilization, but they are not sufficient to explain the emergence of civilization in general.

- e. Having finished reading the preceding article, do you see anything wrong with the Physical Environment Theory for the Emergence of Civilizations? What?

THEORIES

3. On the Irrigation Theory

This Irrigation Theory is quite logical. The development of complex, large-scale irrigation systems certainly contributed to the development of civilizations and goes far in explaining how these civilizations developed. But did these irrigation systems cause civilization to develop?

There is evidence that the political structures necessary for administering large irrigation systems were the result not the cause of the political institutions. Also, is tremendous centralization of authority the only way in which large-scale irrigation enterprises can be handled? Could they be handled by cooperation?

It is true, too, that the irrigation systems which developed in the different early civilizations were not all alike and did not all develop in identical ways. Can we make the sweeping generalization that the development of large irrigation systems caused civilizations to develop? Probably not. There were other important factors in the development of civilizations, also.

THEORIES

- a. What was the Irrigation Theory? Summarize below the important features of the theory in your own words.
- b. How does this theory differ from the racial and environmental theories?
- c. Does this theory adequately explain why civilizations developed?

THEORIES

5. As you read the following article be thinking about this question. Then answer the question after you have finished the article.

How does the approach described below differ from the theories we have been discussing?

Many serious scholars think that it is not useful to ask the question "why?" about the emergence of civilization, since the question can never really be answered to everyone's satisfaction. Instead, they are concentrating on answering the question "how?" They feel that, if there are any real causes for the emergence of civilization, these causes must be a part of the cultural development itself.

A number of theories have been used to describe how civilizations emerged. One theory states that all men passed through essentially the same stages in their cultural development. One formulation of this theory stated that man passed from "savagery" to "barbarism" to "civilization." We would quibble with the first two terms since their use is obviously the result of value judgments, but what about the theory itself? Did all men pass through exactly the same stages? Probably not. And are not the stages above so general that they would not be useful in describing particular cultures?

According to some persons, civilization developed only once, in one spot, and diffused from this place to other parts of the world. We have already seen that this is incorrect. Civilization arose independently in at least two places--in Old and New Worlds. Dr. Julian Steward, in his book Theory of Culture Change, stated that he thought there were many lines of cultural development, some of which led to civilization and some of which didn't. He noted both similarities and differences in the chains of events in cultural development in different parts of the world.

Dr. Steward noted both similarities and differences in the chains of events in cultural development in different parts of the world. He tried to find which developments were related to each other. He noted that certain general types of cultures often developed in similar ways in similar conditions, but that the specifics of cultures did not appear among cultures in regular sequences.

For instance, patrilineal bonds occur cross-culturally with great regularity among some peoples who have certain traditions and who live in certain environments. But not all peoples live under exactly the same traditions or in exactly the same environments, so not all peoples who live in patrilineal bands eat the same foods or live in the same kinds of houses. The same is true for other levels of social and cultural integration, such as the hunting band level or the level of early civilizations.

Dr. Steward also stated that any given level is preceded by other, earlier developments. For instance, local government of some sort preceded regional government. He also emphasized the cause and effect relationships within each

THEORIES

level of social and cultural integration. For instance, more craft specialization affected the development of cities which affected the political institutions, etc.

According to Dr. Steward, the process of cultural development involves the increasing complexity of culture, but he does not try to provide a cultural explanation of all human cultural development. He takes into account the different physical environments and different culture histories of man's differing cultures. He does not try to find one basic cause for the development of civilization.